

# **IPA-2000S**

Infusion Pump Analyzer  
with Safety Analyzer

# **IPA-2000**

Infusion Pump Analyzer

## **User Manual**

*Manual 2000S01  
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Revision 8  
October 2003*

### NOTICES

#### LIMITED WARRANTY

**WARRANTY:** BC Biomedical warrants its new products to be free from defects in materials and workmanship under the service for which they are intended. This warranty is effective for twelve months from the date of shipment.

**EXCLUSIONS:** This warranty is in lieu of any other warranty, expressed or implied; including, but not limited to, any implied warranty of merchantability or fitness for a particular purpose.

BC Biomedical is not liable for any incidental or consequential damages.

No person other than an officer is authorized to give any other warranty or assume any liability.

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(1) The repair or replacement of defective parts or products.  
(2) At the discretion of BC Biomedical, the refund of the purchase price.

Specifications and information contained in this document are for informational use only and are subject to change without notice. This material should in no way be construed as a commitment by BC Biomedical. It has been checked carefully and is believed to be correct. However, no responsibility or liability for any errors or inaccuracies is assumed by BC Biomedical.

The unit covered by this manual is for routine maintenance only. It is not to be used for calibration.

# INTRODUCTION

## PRODUCTS COVERED BY MANUAL

This manual gives a comprehensive overview of all the available features for the IPA-2000 Series of products. Some of the sections and information are not applicable to every product.

**IPA-2000S:** This product includes the Infusion Pump Analyzer and the Safety Analyzer. All portions of this manual are applicable.

**IPA-2000:** This product includes only the Infusion Pump Analyzer. The portions of this manual referring to the Safety Analyzer are not applicable.

## DOCUMENT REVISION RECORD:

<u>REVISION</u>	<u>DATE</u>	<u>PROGRAM</u>	<u>VERSION</u>	<u>CHANGES</u>
1	7/02	DT7310CB	1.2	Beta Version Release
2	10/02	DT7310CD (2000S)	1.4 (2000S)	Specifications Updated
		DT7315CA (2000)	1.1 (2000)	2000 References
3	1/03	DT7310CF (2000S)	1.6 (2000S)	Specifications Updated
		DT7315CC(2000)	1.3 (2000)	Editing Updates
4	4/03	DT7310CG(2000S)	1.7(2000S)	Priming, Purging and
		DT7315CD(2000)	1.4(2000)	Editing Updates
5	5/03	DT7310CH(2000S)	1.8(2000S)	Editing
		DT7315CE(2000)	1.5(2000)	Updates
6	6/03	DT7310CI(2000S)	1.9(2000S)	Alarm List Adjusted
		DT7315CF(2000)	1.6(2000)	
7	7/03	DT7310CJ(2000S)	1.10(2000S)	Specifications Updated
		DT7310CF(2000)	1.6(2000)	
8	10/03	DT7310CK(2000S)	1.11(2000S)	Line Voltage, Baud
		DT7310CF(2000)	1.6(2000)	Rate and Alarm Scan

# INTRODUCTION

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## ABOUT THE IPA-2000 SERIES

### PART 1 : ABOUT THE IPA-2000 Series



The IPA-2000S is an Infusion Pump Analyzer that can perform Flow, Flow--PCA, Distal Occlusion and Proximal Occlusion tests. Also included is a built-in Safety Analyzer that can be run manually or automatically, greatly simplifying the testing process.

There can be up to two Infusion Pump test modules connected to the main unit. These Interface Modules are totally interchangeable and may plug into either of the two inputs. The unit automatically senses the interface modules and their locations. It will then configure the system accordingly.

There are provisions for a keyboard, a printer and a serial communications cable on the back of the unit. These allow for keyboard data entry, printing of reports, downloading of data and uploading of programs.

## ABOUT THE IPA-2000 SERIES



The IPA-2000 is an Infusion Pump Analyzer that can perform Flow, Flow--PCA, Distal Occlusion and Proximal Occlusion tests. Portions of this manual dealing with the Safety Analyzer are not applicable to this unit.

There can be up to two Infusion Pump test modules connected to the main unit. These Interface Modules are totally interchangeable and may plug into either of the two inputs. The unit automatically senses the interface modules and their locations. It will then configure the system accordingly.

There are provisions for a keyboard, a printer and a serial communications cable on the back of the unit. These allow for keyboard data entry, printing of reports, downloading of data and uploading of programs.

## **INFUSION PUMP ANALYZER OVERVIEW**

### **INFUSION PUMP ANALYZER OVERVIEW**

The Infusion Pump Analyzer is used to monitor the flow and pressure of the fluid moving through a pump. There are four tests within the Infusion Pump Analyzer: Flow, Flow--PCA, Distal Occlusion and Proximal Occlusion. Fully configured with two interface modules, the system can run two independent channels, with any combination of tests active.

The Flow test records elapsed time, average flow, instantaneous flow, volume and pressure at data points and reports the average flow, total volume, elapsed time and back pressure at the conclusion of the test. The Flow--PCA test adds a connection for the module to simulate patient request when there is no flow. The Flow--PCA test records all the aforementioned information as well as additional Bolus data and lockout times, average Bolus flow, average Bolus volume, average lockout time and number of deliveries.

The Distal Occlusion test records time and pressure and gives the maximum pressure and its time. The Proximal Occlusion test is a convenient timer to use when performing the Proximal test manually on the DUT.

## **SAFETY ANALYZER OVERVIEW**

### **SAFETY ANALYZER OVERVIEW**

The Safety Analyzer is used to check the electrical current going through and leaking from the Device Under Test (DUT).

The Safety Analyzer can be run manually or automatically. In the manual mode, the settings for leakage type, polarity and the hot and neutral leads are manipulated using the Manual Safety Analyzer keypad on the unit.

In the automatic mode, the system will perform all of the required test combinations with the DUT both on and off and record all of the data. It will then report the maximum normal and fault leakage currents for both Chassis and Ground leakage, as well as the method that produced the maximum current measurement.

The limits for the Ground Resistance and Leakage Current measurements can be selected as AAMI, Custom or IEC.

## **INSTRUMENT OVERVIEW**

### **INSTRUMENT PHYSICAL OVERVIEW**

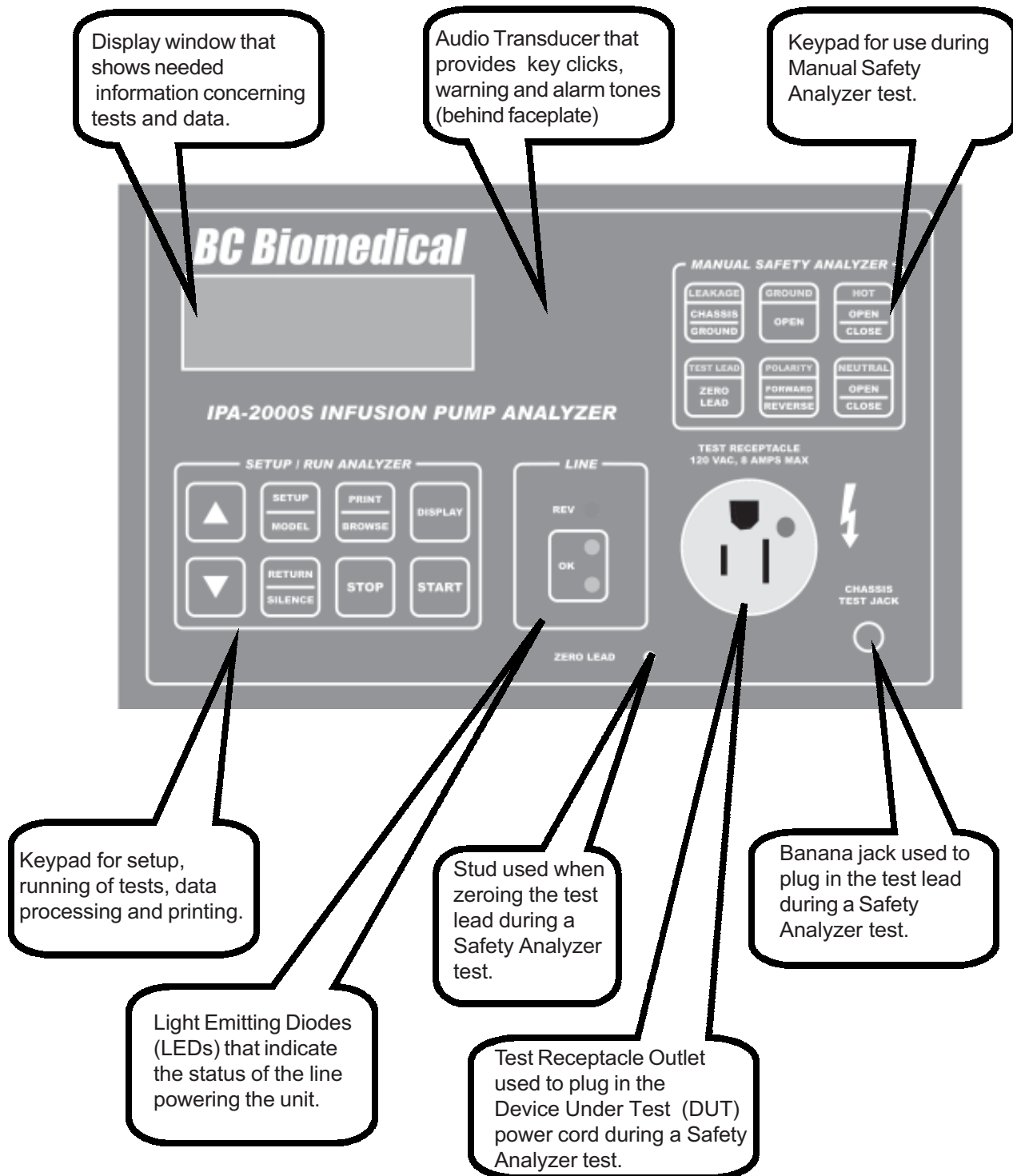
This section gives a pictorial overview of the system.

Included are:

- Main Unit Front Panel pictorial with details
- Main Unit Specific Keypad details
- Main Unit Rear Panel pictorial with details
- Module Front Panel pictorial with details
- Module Rear Panel pictorial with details
- Commercial and Main Screens

## INSTRUMENT OVERVIEW

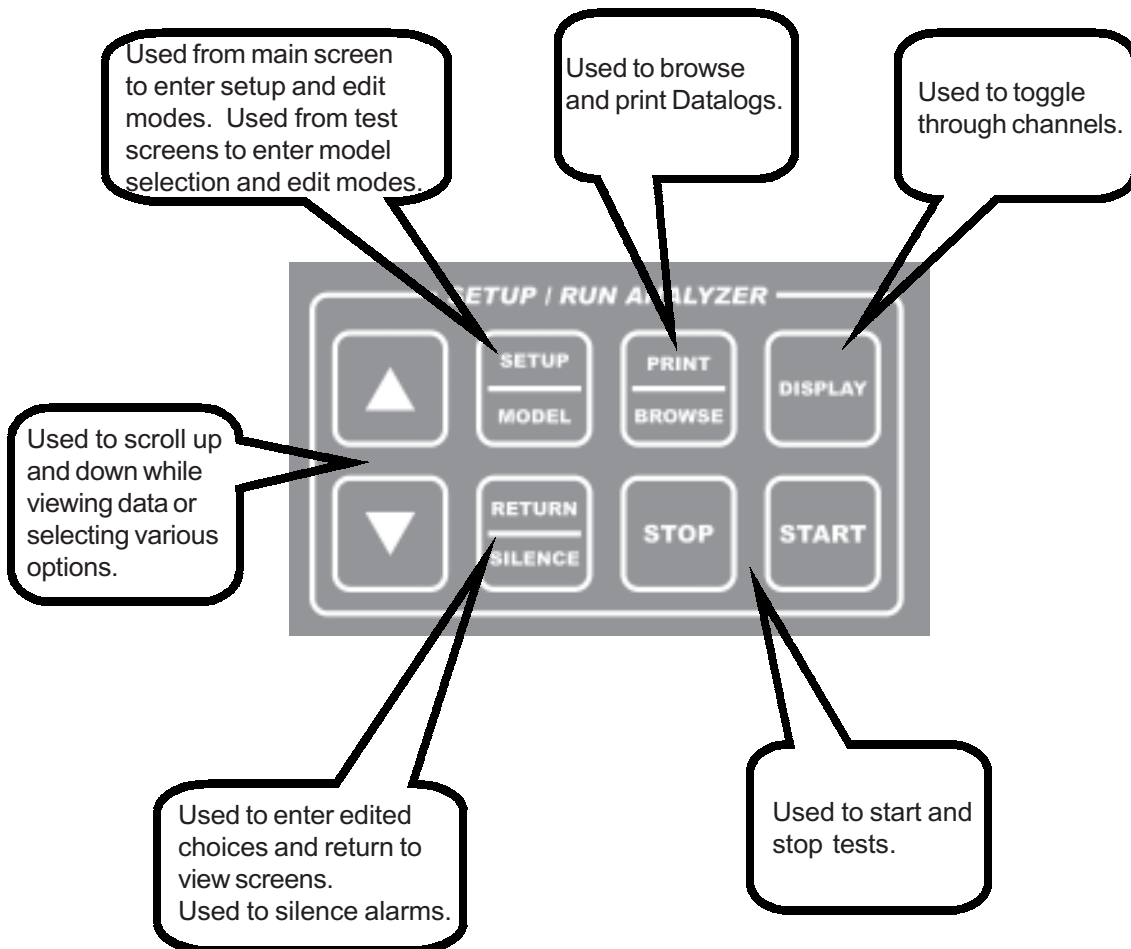
### UNIT FRONT-PANEL



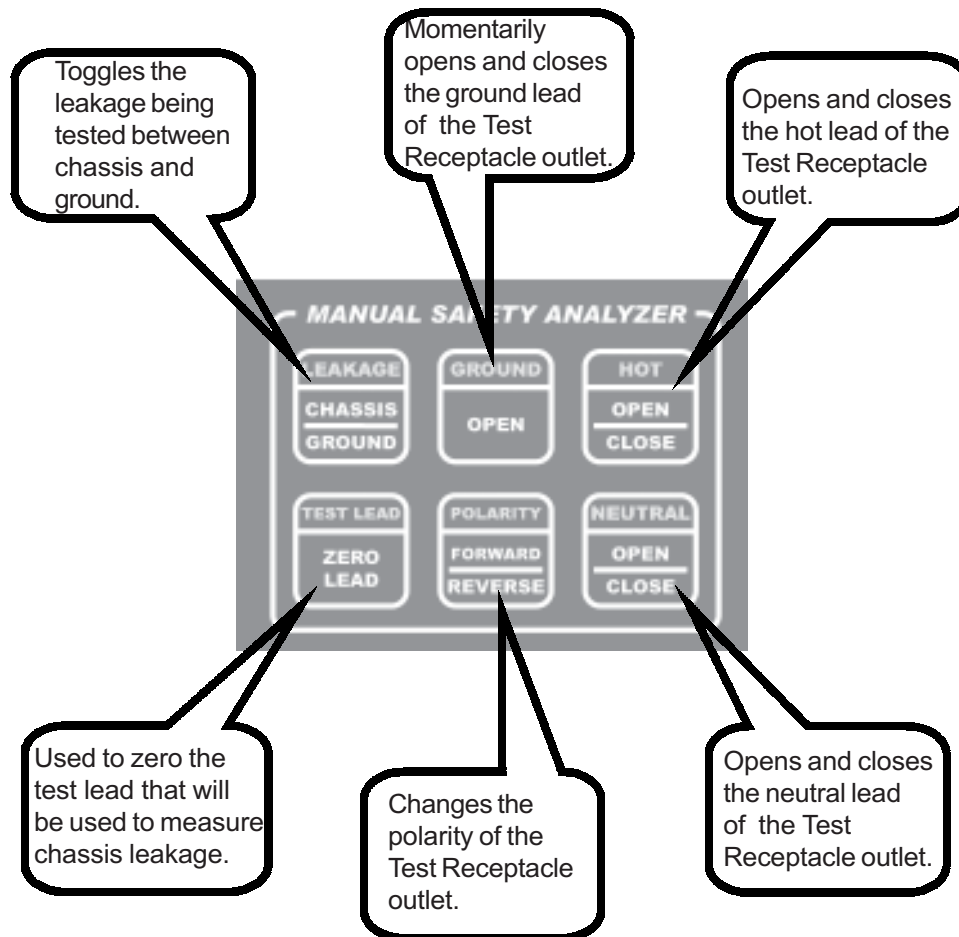


## INSTRUMENT OVERVIEW

### UNIT FRONT-PANEL CONTROLS

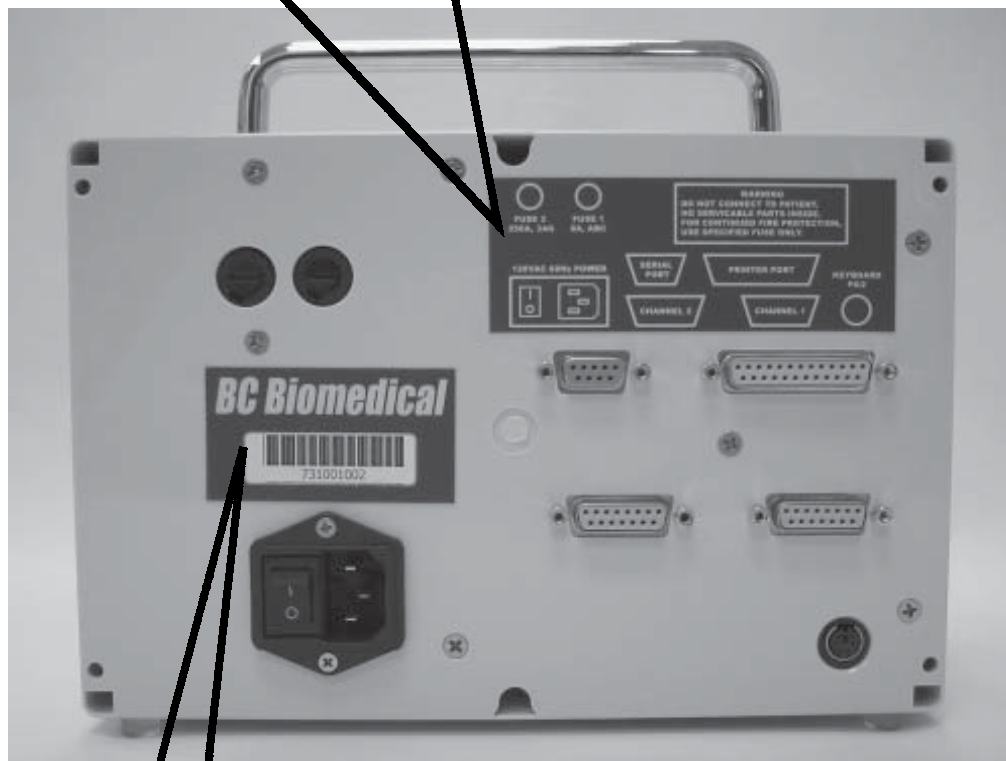
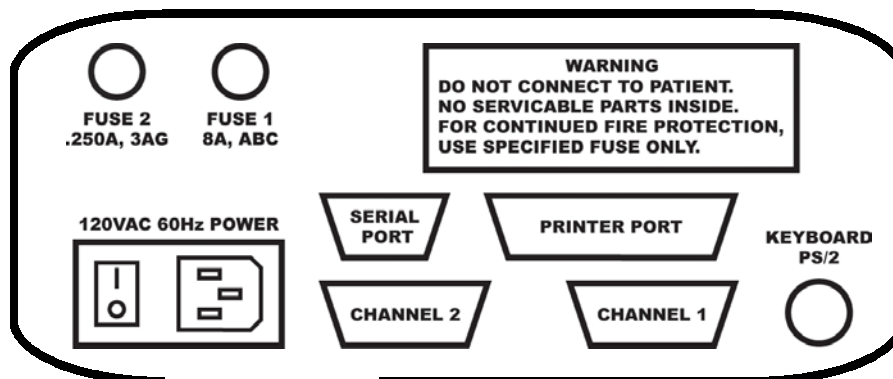


## INSTRUMENT OVERVIEW



# INSTRUMENT OVERVIEW

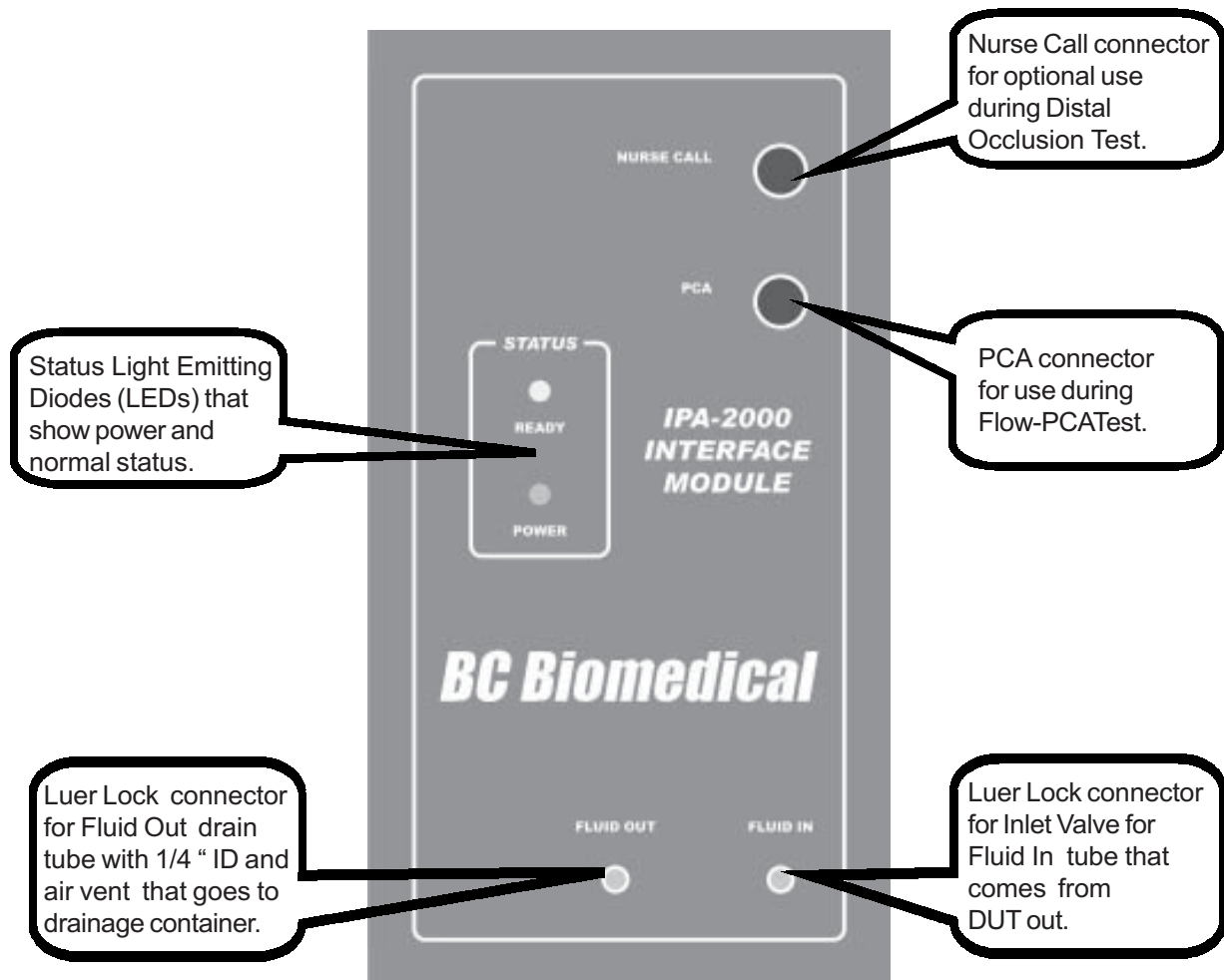
## UNIT BACK-PANEL



Model / Serial  
Number and  
barcode for  
the unit.

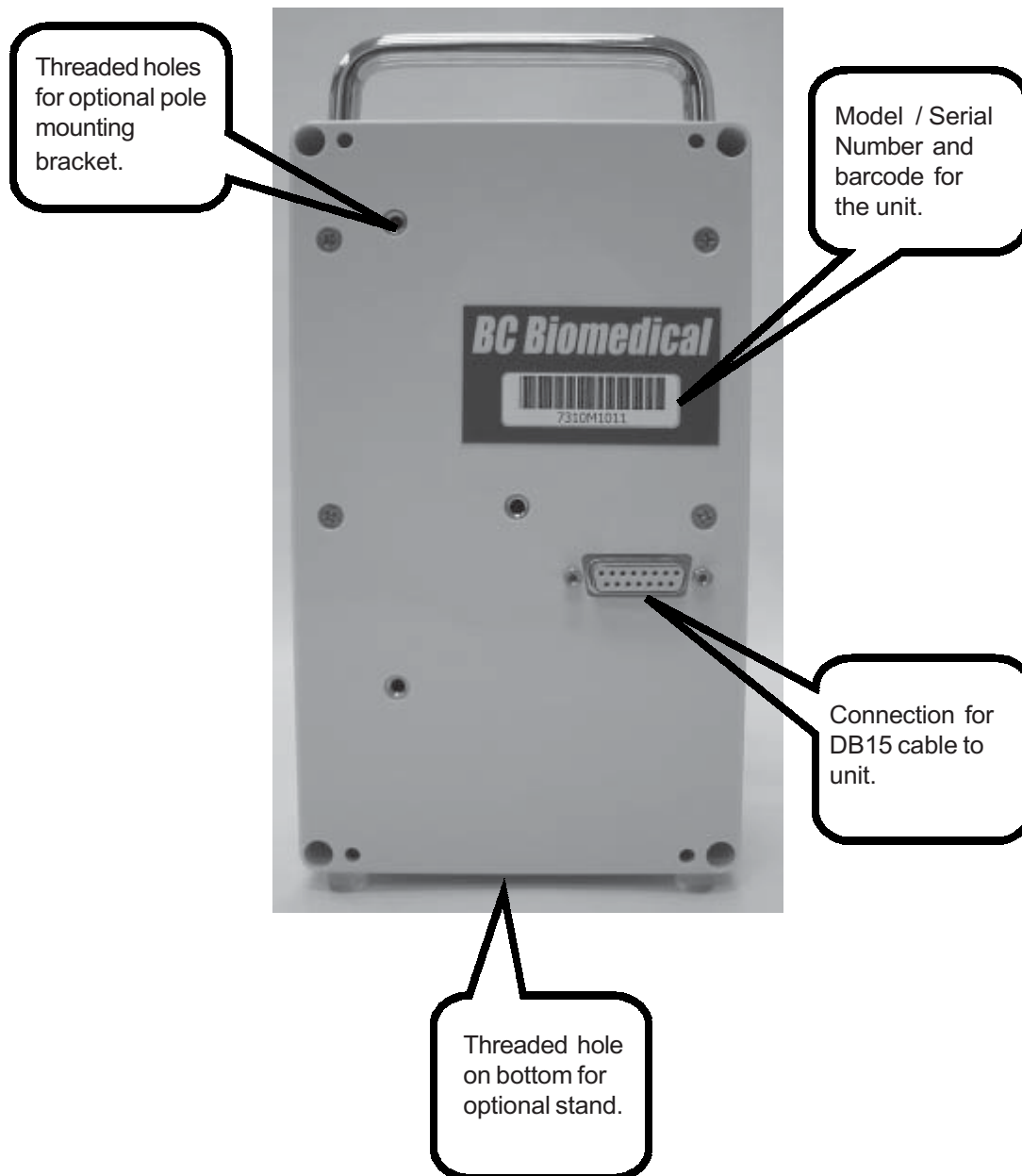
## INSTRUMENT OVERVIEW

### MODULE FRONT-PANEL



## INSTRUMENT OVERVIEW

### MODULE BACK-PANEL



# INSTRUMENT OVERVIEW

## COMMERCIAL AND MAIN SCREENS

### NOTES:

- The Commercial screen displays while the system is initiating.
- The unit model and program version appear on this screen.

**BC GROUP  
INFUSION ANALYZER  
MODEL IPA-2000S  
VER X.X**

### NOTES:

- The Main screen displays after approximately 3 seconds.
- From this screen, central access to the Datalogger can be obtained with or without modules attached, current active alarms may be viewed, the Setup mode can be accessed and test screens can be toggled to.
- The Display key is used to cycle back to the Main screen from other locations.
- The time of day clock and date appear on this screen, the format and value of which can be selected in User Setup.

**IPA-2000S  
Month Day, Year  
00:00:00**

### CONNECTIONS OVERVIEW

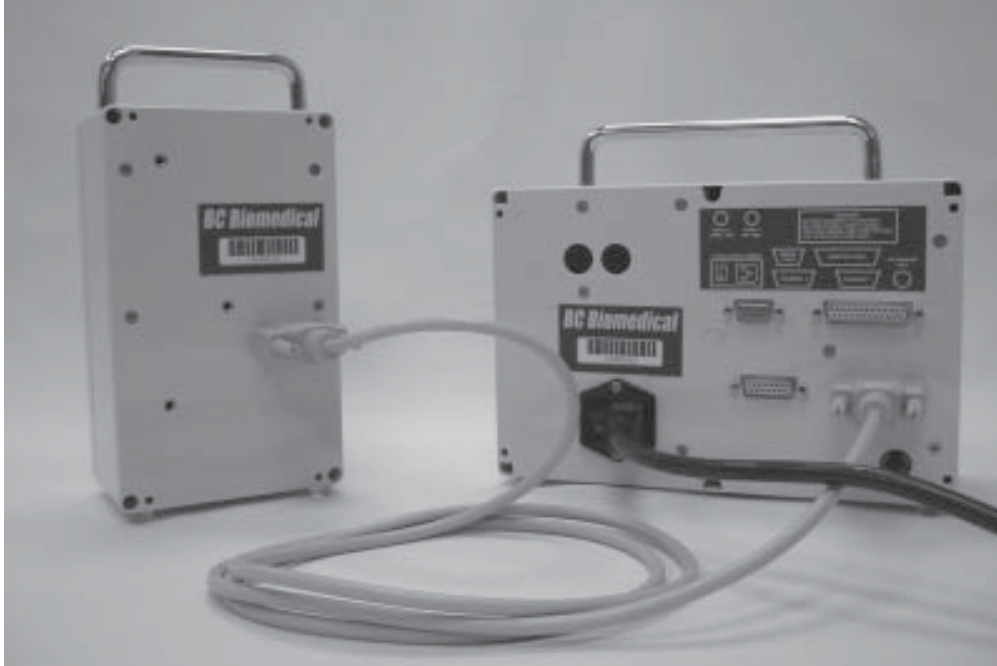
This section gives a pictorial overview and explanation of connections for the unit and modules.

Included are:

- Main Unit to Module connection
- Main Unit to Printer connection
- Main Unit to Keyboard connection
- Main Unit Computer connection
- System to DUT for Infusion Pump Analysis
- System to DUT for Safety Analysis

## CONNECTIONS

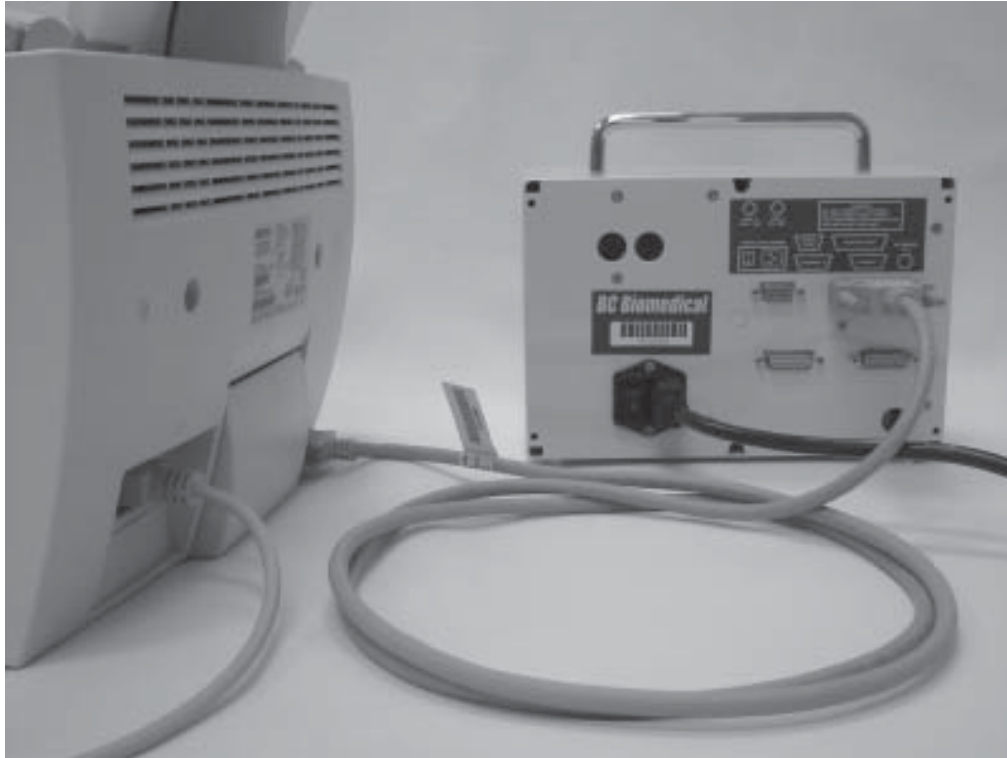
### MODULE CONNECTION



- Modules are connected during use of the Infusion Analyzer.
- A module is connected using a DB15 cable from the port on the back of the module to one of the Channel ports on the back of the unit.
- Modules are interchangeable and can be connected to either Channel 1 or 2.



### PRINTER CONNECTION



- Any standard printer can be connected to the unit using a Centronics parallel cable (IEEE-1284).
- The printer is connected from the parallel port of the printer to the parallel port of the unit.
- A serial printer can also be connected to the unit using an RS232 cable (DB9).
- The printer is connected from the serial port of the printer to the serial port of the unit.
- (See **PRINTING REPORTS** for details on how to print.)

### KEYBOARD CONNECTION



- Any PS/2 style keyboard can be connected to the unit.
  - The keyboard cable is connected to the PS/2 port of the unit.
  - (Optional) Labels for the keyboard illustrate how the Function and Arrow keys correspond to the controls on the unit.
  - Full remote control of the unit can be obtained through use of the keyboard.
  - The standard keys can then be used to type in Manufacturer, Model, S/N, Department and Location to help identify tests in the Datalogger and printouts.
- (See **MODEL SELECTION** for details.)

## CONNECTIONS

### COMPUTER CONNECTION



- An RS232 cable (DB9) can be used to interface the unit with a computer.
- The RS232 cable is connected from a communication port on the computer to the Serial Port on the unit.
- The RS232 connection can be utilized to download reports from the unit.
- The RS232 connection can be utilized to load updated programs to the unit. (See **FLASH** for details.)

## CONNECTIONS

### INFUSION PUMP ANALYZER / DUT CONNECTION



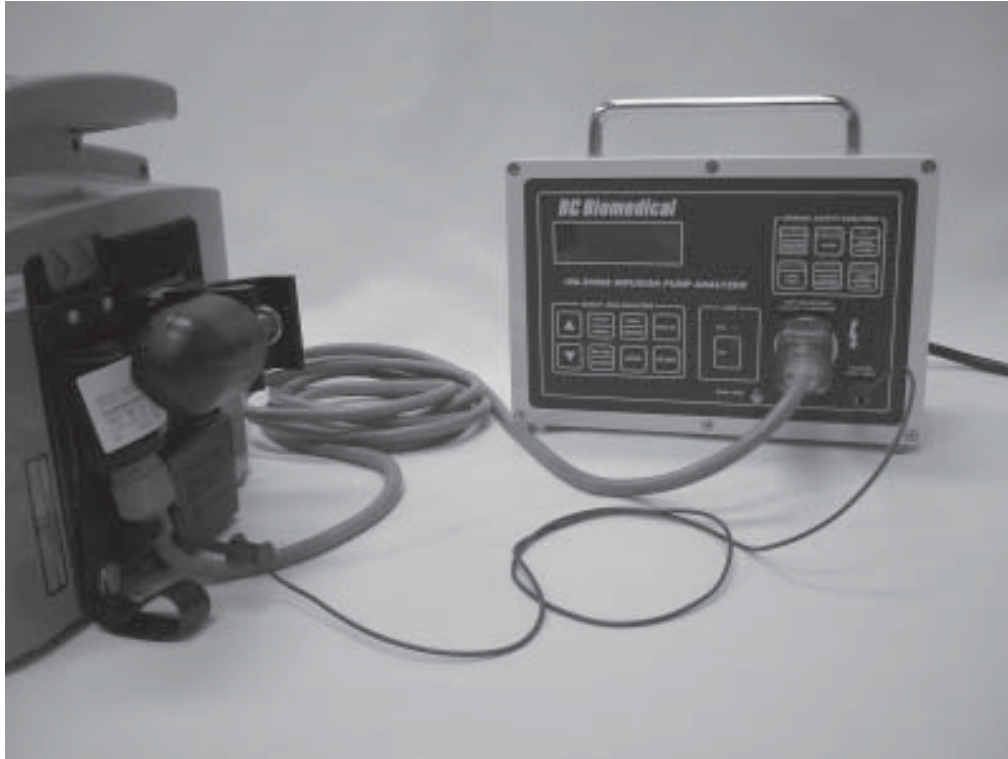
- For Infusion Analyzer Tests, the following connections must be made:
  - Interface module to unit
  - Fluid source to device under test (DUT)
  - Inlet Valve to module Fluid In
  - DUT Fluid Out to Inlet Valve
  - Module Fluid Out 1/4" ID Drain Tube with air vent to drainage container
  - DUT power cord to Unit receptacle
  - Unit power cord to wall receptacle

## CONNECTIONS



- For Infusion Analyzer Tests, the following module connections must be made:
  - Inlet Valve to module Fluid In
  - DUT Fluid Out to Inlet Valve
  - Module Fluid Out 1/4" ID Drain Tube with air vent to drainage container

### SAFETY ANALYZER / DUT CONNECTION



- For Safety Analyzer Tests, the following connections must be made:
  - Test lead into banana jack on unit.
  - Test lead hooked to chassis of device under test (DUT)  
(See Pump Manufacturer Manual for requirements or special instructions for placement.)
  - DUT power cord to Unit receptacle
  - Unit power cord to wall receptacle

## SPECIFICATIONS

### SPECIFICATIONS

The following is a table showing the specifications for the Infusion Analyzer:

FLOW RANGE (AVERAGE)	0.5 - 999.9 mL/hr
FLOW ACCURACY	+/- 2 % of reading +/- LSD 10 mL Minimum Volume
VOLUME RANGE	0.07 - 999.99 mL
VOLUME ACCURACY	+/- 2 % of reading +/- LSD 10 mL Minimum Volume
OCCLUSION PRESSURE	0 - 35 PSI +/- 5 % of reading +/- LSD
NUMBER OF CHANNELS	2 Maximum

The following is a table showing the specifications for the Safety Analyzer:

LINE VOLTAGE (Measured L - G)	90 - 140 VAC +/- 2 % FS +/- 1 LSD
LOAD CURRENT	0.2 - 8.0 A +/- 5 % FS +/- 1 LSD
GROUND RESISTANCE	0.00 - 20.00 $\Omega$ +/- 1 % FS +/- 1 LSD
LEAKAGE CURRENT (Frequency response subject to constraints of AAMI test load.)	1 - 2000 $\mu$ A
DC & 25 Hz - 1.00 KHz	+/- 1.0 % FS +/- 1 LSD (1 - 1000 $\mu$ A) +/- 2.0 % FS +/- 1 LSD ( > 1000 $\mu$ A)
1.00 KHz - 100 KHz	+/- 2.5 % FS +/- 1 LSD
100 KHz - 1.00 MHz	+/- 5.0 % FS +/- 1 LSD

The following is a table showing the general specifications for the unit:

POWER REQUIREMENT	.65 A @ 120 VAC + 20 % to - 10 % 50/60 Hz
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### **PART 2 : GENERAL OPERATIONS**

This section covers the general operations of the unit.

Included are:

- How to Setup the System
  - Administration
  - User
- How to Select Model Information
- How to Prime the System
- How the Datalogger Generally Works
- How to Print a Report
- How System Memory Works
- How Alarms Work
- How to Flash a Program

# **ADMINISTRATION SETUP**

## **ADMINISTRATION SETUP OVERVIEW**

The system is configured to specific application requirements via a set of Administration parameters. This section covers the general setting of those parameters, including how to access, change and save. There is also a listing of all available Settings and Choices and an explanation of their use.

The following is an outline of the steps that are involved in selecting the Administration Setup for the system.

### **ADMINISTRATION SETUP**


- Begin from Main Screen
- Enter Setup Screen
- View Setup Parameters
- Choose Setup Parameter to Edit
- Go into Setup Edit Mode
- Scroll to Desired Choice for Parameter
- Edit Other Parameters
- Save and Return to Main Screen

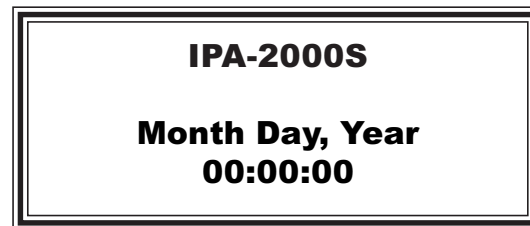
## ADMINISTRATION SETUP

### ADMINISTRATION SETUP

#### STEP 1 ➤


##### Begin from Main Screen

The Setup screens for the unit are accessed through the Main screen. Use  to toggle to the Main screen.

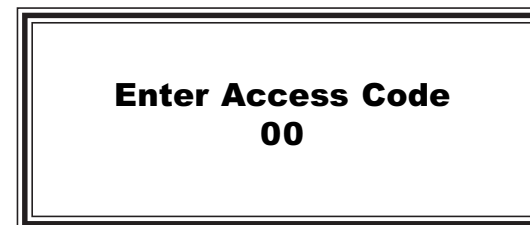
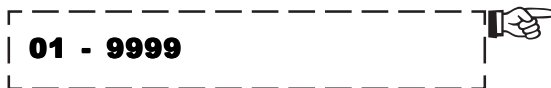


#### STEP 2 ➤

##### Enter Setup Screen



Use  to enter the Access Code screen for Setup for the system.


##### AVAILABLE ACCESS CODES



#### NOTE:

•Unit is shipped with Administration Stack access code set to 02.

Use   to enter the access code.

After setting the code, use  to enter the Administration Setup-View screen for the system.

## ADMINISTRATION SETUP

### STEP 3 ➤

#### NOTES:

- The system's function is controlled by a number of setup parameters.
- The selected parameter is indicated by the flashing cursor.
- The screen displays any three consecutive data lines.
- Some values are not shown when using AAMI or IEC specifications.

#### View Setup Parameters

Use



to scroll the available parameters.

#### AVAILABLE SETUP PARAMETERS



**SOFTWARE**  
**GROUND OFFSET**  
**SAFETY SPECS**  
**GROUND RESIST**  
**NORM GND CUR**  
**FAULT GND CUR**  
**NORM CHS CUR**  
**FAULT CHS CUR**  
**LINE VOLTAGE**  
**CLEAR MODELS**  
**ALLOW MODEL EDIT**  
**CH 1 SERIAL NUM**  
**CH 2 SERIAL NUM**  
**ACCESS CODE #2**

<b>ADMIN SETUP</b>	-	<b>VIEW</b>
<b>SOFTWARE</b>		<b>DT7310CB</b>
<b>GROUND OFFSET</b>		<b>.02Ω</b>
<b>SAFETY SPECS</b>		<b>CUSTOM</b>

## ADMINISTRATION SETUP

The following is a table showing descriptions and choices for available parameters:

PARAMETER	DESCRIPTION	CHOICES
SOFTWARE	Displays the current program number for the software that is running the unit	READ ONLY
GROUND OFFSET (2000S ONLY)	Allows a fixed value to be used to compensate for the standard internal and test lead resistance of the Ground Test Lead. NOTE: The Ground Test Lead Calibration will further compensate for this value. A manual setting here simply makes the base value closer to the result before the actual calibration.	-0.20 to +0.20 $\Omega$
SAFETY SPECS (2000S ONLY)	Determines whether the PASS/FAIL values for the Electrical Safety Analyzer are based on user-selected values (Custom), AAMI 1993 standard parameters or IEC parameters.	Custom, AAMI or IEC
GROUND RES (2000S ONLY)	Determines the maximum allowable ground resistance in the Electrical Safety test. This parameter is only available when the SAFETY SPECS parameter is set to CUSTOM.	0.00 - 2.00 $\Omega$
NORM GND CUR (2000S ONLY)	Determines the maximum allowable ground leakage current in the Electrical Safety test under normal receptacle conditions. Normal conditions consist of forward/reversed polarity, DUT power ON and OFF and both Hot and Neutral connections intact. This parameter is only available when the SAFETY SPECS parameter is set to CUSTOM.	0-2000 $\mu$ A
FAULT GND CUR (2000S ONLY)	Determines the maximum allowable ground leakage current in the Electrical Safety test under fault receptacle conditions. Fault conditions consist of forward/reversed polarity, DUT power ON and OFF and either the Hot or Neutral connections open. This parameter is only available when the SAFETY SPECS parameter is set to CUSTOM.	0-2000 $\mu$ A
NORM CHS CUR (2000S ONLY)	Determines the maximum allowable chassis leakage current in the Electrical Safety test under normal receptacle conditions. Normal conditions consist of forward/reversed polarity, DUT power ON and OFF and Ground intact. This parameter is only available when the SAFETY SPECS parameter is set to CUSTOM.	0-2000 $\mu$ A
FAULT CHS CUR (2000S ONLY)	Determines the maximum allowable chassis leakage current in the Electrical Safety test under fault receptacle conditions. Fault conditions consist of forward/reversed polarity, DUT power ON and OFF and Ground open. This parameter is only available when the SAFETY SPECS parameter is set to CUSTOM.	0-2000 $\mu$ A
LINE VOLTAGE (2000S ONLY)	Selects the line voltage for the Safety Analyzer. Used for Line Voltage validation for the Automated Safety Analyzer tests.	100 V 120 V
CLEAR MODELS	Erases all the data stored in all the MODELS (Done upon exiting the Setup mode)	NO YES
ALLOW MODEL EDIT	Provides a means to lock the Model table settings so the user can not change them.	NO YES
CH 1 SERIAL NUM	Displays the serial number of the module connected to Channel 1 (Automatically done upon detection of new module.)	READ ONLY
CH 2 SERIAL NUM	Displays the serial number of the module connected to Channel 2 (Automatically done upon detection of new module.)	READ ONLY
ACCESS CODE #2	Sets the access code needed for entry into this stack (ADMIN Stack from Setup screen)	0 - 9999



## ADMINISTRATION SETUP

### STEP 4 ➤

#### NOTES:

- The selected parameter is indicated by the flashing cursor.
- Each parameter can be edited separately, using these same steps.

#### Choose Setup Parameter to Edit

Use   to scroll to the desired parameter to edit.

ADMIN SETUP	-	VIEW
SOFTWARE		7310L09F
GROUND OFFSET		.02 <u>Ω</u>
SAFETY SPECS		CUSTOM

### STEP 5 ➤

#### NOTE:

- In the Edit mode, the flashing line cursor will change to a box.

#### Go into Setup Edit Mode

When the cursor is under the desired parameter,



use  to enter the Edit mode.

ADMIN SETUP	-	EDIT
SOFTWARE		7310L09F
GROUND OFFSET		.02 <span style="border: 1px solid black; display: inline-block; width: 1em; height: 1em; vertical-align: middle;"></span>
SAFETY SPECS		CUSTOM

## ADMINISTRATION SETUP

### STEP 6 ➤


#### Scroll to Desired Choice for Parameter

Use   to scroll through the choices for the parameter.

<b>ADMIN SETUP</b>	-	<b>EDIT</b>
<b>SOFTWARE</b>		<b>7310L09F</b>
<b>GROUND OFFSET</b>		<b>.01</b> 
<b>SAFETY SPECS</b>		<b>CUSTOM</b>

### STEP 7 ➤

#### Enter Choice for Parameter

Use  to enter the new setting for the parameter and return to the View mode.

<b>ADMIN SETUP</b>	-	<b>VIEW</b>
<b>SOFTWARE</b>		<b>7310L09F</b>
<b>GROUND OFFSET</b>		<b>.01</b> <u><b>Ω</b></u>
<b>SAFETY SPECS</b>		<b>CUSTOM</b>

### STEP 8 ➤


#### Edit Other Parameters

Repeat steps 3 through 7 to edit any other parameters.

### STEP 9 ➤

#### Save and Return to Main Screen

Once all the parameters show the desired settings,

use  to save and return to the Main screen.

**\*\*SAVE MODE\*\***

**IPA-2000S**

**Month Day, Year**

**00:00:00**



### **USER SETUP OVERVIEW**

The system is configured to specific use requirements via a set of User parameters. This section covers the general setting of those parameters, including how to access, change and save. There is also a listing of all available Settings and Choices and an explanation of their use.

The following is an outline of the steps that are involved in selecting the User Setup for the system.

#### **USER SETUP**


- Begin from Main Screen
- Enter Setup Screen
- View Setup Parameters
- Choose Setup Parameter to Edit
- Go into Setup Edit Mode
- Scroll to Desired Choice for Parameter
- Edit Other Parameters
- Save and Return to Main Screen

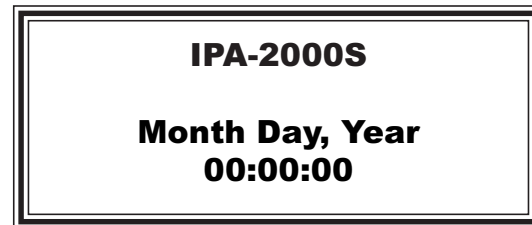
## USER SETUP

### USER SETUP

#### STEP 1 ➤


##### Begin from Main Screen

The Setup screens for the unit are accessed through the Main screen. Use  to toggle to the Main screen.

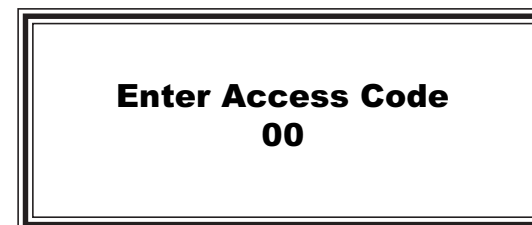
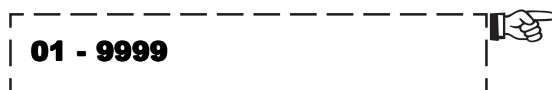


#### STEP 2 ➤

##### Enter Setup Screen



Use  to enter the Access Code screen for Setup for the system.


##### AVAILABLE ACCESS CODES



##### NOTE:

•Unit is shipped with User Setup access code set to 00.

Use   to enter the access code.



After setting the code, use  to enter the User Setup-View screen for the system.

STEP 3 ➤


View Setup Parameters

NOTES:

- The system’s function is controlled by a number of setup parameters.
- The selected parameter is indicated by the flashing cursor.
- The screen displays any three consecutive data lines.

Use   to scroll the available parameters.

AVAILABLE SETUP PARAMETERS

- 
- AIR PURGE
  - UNITS FLOW
  - UNITS PRESS
  - HIGH FLOW
  - LOW FLOW
  - TIME
  - DAY
  - MONTH
  - YEAR
  - DATE FORMAT
  - BAUD RATE
  - PRINT MODE
  - PRINT PORT
  - PRINT FORMAT
  - PRINT ALL DATA
  - LOG INTERVAL
  - LOG DATA EVERY
  - CLEAR DATA
  - ALARM SCAN
  - ACCESS CODE #1

USER SETUP	-	VIEW
UNITS FLOW		cc/hr
UNITS PRESS		PSI
HIGH FLOW		0.0 cc/hr

The following is a table showing descriptions and choices for available parameters:

PARAMETER	DESCRIPTION	CHOICES
AIR PURGE	Used to open solenoid ato allow air to dry out the unit.	ON OFF
UNITS FLOW	Allows selection of the scientific measurement units for the flow reading	mL/hr cc/hr
UNITS PRESS	Allows selection of the scientific units for the pressure reading	PSI     "H <sub>2</sub> O @ 60°F mmHg @ 0°C ATM     kPA
HIGH FLOW	Enters the High Flow Alarm Setpoint. If measured flow is above this setpoint, High Flow Alarm will activate	0 - 999.9 mL/hr (Setting to 0 will eliminate this alarm feature.)
LOW FLOW	Enters the Low Flow Alarm Setpoint. If measured flow falls below this setpoint ( <i>during test</i> ), Low Flow Alarm will activate	0 - 999.9 mL/hr (Setting to 0 will eliminate this alarm feature.)
TIME	Sets time of day of the real-time clock HH:MM:SS	00:00:00 - 23:59:59
DAY	Sets the day of the month of the real-time clock	01 - 31
MONTH	Sets the month of the year of the real-time clock	JANUARY - DECEMBER
YEAR	Sets the year of the real -time clock	2000 - 2099
DATE FORMAT	Sets the format of the date of the real-time clock	MM/DD/YY DD/MM/YY
BAUD RATE	Sets the 'BAUD' for the Communications Protocol	2400 4800 9600 28800 57600 115200
PRINT MODE	Allows selection of print mode Manual - Data printed using Print key Summary - Summary automatically printed Data - Datalog automatically printed Both - Summary and Datalog automatically printed at end of test	MANUAL SUMMARY DATA BOTH
PRINT PORT	Sets the printer port type	SERIAL PARALLEL NONE
PRINT FORMAT	Sets the number of columns for the printout format	80 COL 40 COL
PRINT ALL DATA	Prints all the date stored in all the Datalogs ( <i>Done upon exiting the Setup mode then resets to NO</i> )	YES NO
LOG INTERVAL	Selects the mode for storing Data into the Datalog Auto - Data automatically stored when collected Manual - time interval between each Data point can be set to expand total Data collection time.	AUTO MANUAL
LOG DATA EVERY	Selects the time in minutes and seconds between each Data point stored in Datalog MM:SS	00:01 - 99:59 (Only available when Log Interval set to Manual.)
CLEAR DATA	Erases all the data stored in all the Datalogs ( <i>Done upon exiting the Setup mode then resets to NO</i> )	NO YES
ALARM SCAN	Determines the rate at which active alarms are automatically scrolled in the Main Screen.	1 - 25 sec
ACCESS CODE #1	Sets the access code needed for entry into this stack ( <i>User Parameter Stack</i> )	0 - 9999

## STEP 4 ➤

### NOTES:

- The selected parameter is indicated by the flashing cursor.
- Each parameter can be edited separately, using these same steps.

### Choose Setup Parameter to Edit

Use



to scroll to the desired parameter to edit.

<b>USER SETUP</b>	-	<b>VIEW</b>
<b>UNITS FLOW</b>		<b>cc/hr</b>
<b>UNITS PRESS</b>		<b>PSI</b>
<b>HIGH FLOW</b>		<b>0.0 cc/hr</b>

## STEP 5 ➤

### NOTE:

- In the Edit mode, the flashing line cursor will change to a box.

### Go into Setup Edit Mode

When the cursor is under the desired parameter,



use



to enter the Edit mode.


<b>USER SETUP</b>	-	<b>EDIT</b>
<b>UNITS FLOW</b>		<b>cc/h</b>
<b>UNITS PRESS</b>		<b>PSI</b>
<b>HIGH FLOW</b>		<b>0.0 cc/hr</b>

**STEP 6** ➤**Scroll to Desired Choice for Parameter**

Use   to scroll through the choices for the parameter.

<b>USER SETUP</b>	-	<b>EDIT</b>
<b>UNITS FLOW</b>		<b>mL/h</b>
<b>UNITS PRESS</b>		<b>PSI</b>
<b>HIGH FLOW</b>		<b>0.0 cc/hr</b>

**STEP 7** ➤**Enter Choice for Parameter**

Use  to enter the new setting for the parameter and return to the View mode.


<b>USER SETUP</b>	-	<b>VIEW</b>
<b>UNITS FLOW</b>		<b>mL/hr</b>
<b>UNITS PRESS</b>		<b>PSI</b>
<b>HIGH FLOW</b>		<b>0.0 cc/hr</b>

**STEP 8** ➤**Edit Other Parameters**

Repeat steps 3 through 7 to edit any other parameters.

**STEP 9** ➤**Save and Return to Main Screen**

Once all the parameters show the desired settings,

use  to save and return to the Main screen.

**\*\*SAVE MODE\*\***

**IPA-2000S**

**Month Day, Year  
00:00:00**

### **MODEL SELECTION OVERVIEW**

This section covers how to select and edit the model information that can appear in the Datalog and Printouts for each test. It begins with an overview and then progresses through step-by-step instructions for selecting or editing the manufacturer, model, S/N, department and location for the Device Under Test (DUT).

Model selection is optional. It has no affect on a test. It is provided to help organize records by adding text information to the header in the Datalog and Printouts.

One option allows this information to be replaced by lines to indicate that handwritten information should be entered on the printout.

Alternatively, the user may directly key in the header information through the keypad or enter it via the remote keyboard.

As an aid to entry, a number of common selections for manufacturer, model, S/N, department and location are resident in the unit memory and can simply be selected.



The following is an outline of the steps that are involved in selecting the model information for a test.

### **MODEL SELECTION**

- Begin from a Test Screen
- Enter Model View Screen
- View Model Identification and Location
- Choose Information Line to Edit
- Go into Model Select Mode
- Scroll to Desired Choice for Information Line
- or
- Go into Model Edit Mode
- Edit Each Character in the Information Line
- Return to Select Mode
- Enter Choice for Information Line
- Enter Choices for Other Information Lines
- Save and Return to Test Screen

## MODEL SELECTION


### MODEL SELECTION

#### STEP 1 ➤

##### NOTES:

- Model and location information can be entered for each individual test.
- This information is included in the Datalog and on the printout.
- The information is saved for that test and channel only.
- The model and location will have to be entered again for any subsequent tests.

#### Begin from a Test Screen


The Model screens for the unit are accessed through the Test screens. Use  to toggle to the desired test screen.

**SAFETY ANALYZER IDLE**  
**LINE VOLTAGE      XXX.XV**  
**GND: CLOSE    HOT: OPEN**  
**POL: FWD      NEU: OPEN**

**CHANNEL 1      IDLE**  
**SELECT TEST TYPE**  
  
**FLOW TEST**

#### STEP 2 ➤

#### Enter Model View Screen

Use  to go to MODEL VIEW screen to enter Manufacturer, Model, Serial Number, Department and Location.

**CHAN 1 MODEL -VIEW**  
**MANUF:              ABC**  
**MODEL:              123A**  
**S/N:                  12345**

## MODEL SELECTION



### STEP 3 ➤

#### NOTES:

- The DUT can be identified by various model and location information.
- The selected information line is indicated by the flashing cursor.
- The screen displays any three consecutive information lines.

### View Model Identification and Location

There are five available information lines.

Use   to scroll the identification information lines.

#### AVAILABLE INFORMATION LINES

**MANUF**  
**MODEL**  
**S/N**  
**DEPT**  
**LOC**



CHAN 1 MODEL -VIEW	
MANUF:	ABC
MODEL:	123A
S/N:	12345



### STEP 4 ➤

#### NOTES:

- The selected information line is indicated by the flashing cursor.
- The information can be edited either by Selecting from a list of options or Entering the specific information.
- Each line is set separately, using these same steps.

### Choose Information Line to Edit

The information for each information line can be edited.

Use   to scroll to the desired identification information line.


CHAN 1 MODEL -VIEW	
MANUF:	ABC
MODEL:	123A
S/N:	12345

**STEP 5** ➤**NOTE:**

•In the Select mode, the flashing line cursor will change to a box.

**Go into Model Select Mode**

When the cursor is under the desired information line,



use  to enter the Select mode.

<b>CHAN 1 MODEL -</b>	<b>SELECT</b>
<b>MANUF:</b>	<b>AB</b>
<b>MODEL:</b>	<b>123A</b>
<b>S/N:</b>	<b>12345</b>

**STEP 6** ➤**NOTES:**

- There are 10 Manufacturers stored at any given time.
- Each Manufacturer has 10 Models and Serial Numbers associated with it.
- As the Manufacturers are scrolled through, the Models and S/Ns will adjust as well.
- The the Model and S/N can be selected by repeating the steps used to set the Manufacturer.

**Scroll to Desired Choice for Information Line**

Use   to scroll to the desired identification information. If found, continue to Step 7. If the desired information is not available, go to the Model Edit mode to enter it (See Steps 6a through 6c).

<b>CHAN 1 MODEL -</b>	<b>SELECT</b>
<b>MANUF:</b>	<b>DE</b>
<b>MODEL:</b>	<b>123B</b>
<b>S/N:</b>	<b>10000</b>

**NOTE:**

•Duplicate manufactures can be entered, thereby allowing for many models or serial numbers from one manufacturer to be stored.

The unit has 100 data sets available for the storage of model information. They are configured with 10 manufacturer positions with 10 model / serial number sets for each.

## MODEL SELECTION

### STEP 6a ➤

#### NOTES:

- Get to the Model Edit screen from the Select screen.
- In the Edit mode, the flashing cursor box will shift to the first character position after the colon.

### Go into Model Edit Mode

Use  to enter the Edit mode.



<b>CHAN 1 MODEL -</b>	<b>EDIT</b>
<b>MANUF:</b>	<b>ABC</b>
<b>MODEL:</b>	<b>123B</b>
<b>S/N:</b>	<b>10000</b>


### STEP 6b ➤

#### NOTES:

- There may be up to 14 characters for the Manufacturer and Model.
- An information line can be left blank by scrolling all of the characters to blanks.
- When information is changed in the edit mode, the original information is overwritten.

### Edit Each Character in the Information Line

Use   to scroll through the characters available for each position.

Use  to enter each character and proceed to the next character to the right.

#### AVAILABLE CHARACTER OPTIONS


<b>A - Z</b>
<b>a - z</b>
<b>0 - 9</b>
<b>- / + ' *</b>
<b>(blank)</b>



<b>CHAN 1 MODEL -</b>	<b>EDIT</b>
<b>MANUF:</b>	<b>Manufacture</b>
<b>MODEL:</b>	<b>123B</b>
<b>S/N:</b>	<b>10000</b>


### STEP 6c ➤

### Return to Select Mode

Use  to return to Select mode.

**STEP 7 ➤**

**Enter Choice for Information Line**

Use  to enter the new information choice and return to the View mode.

<b>CHAN 1 MODEL</b>	<b>- VIEW</b>
<b>MANUF:</b>	<b>DEF</b>
<b>MODEL:</b>	<b>123B</b>
<b>S/N:</b>	<b>10000</b>


**STEP 8 ➤**

**Enter Choices for Other Information Lines**

Repeat steps 5 through 7 to select the choices for the other information lines.

**STEP 9 ➤**

**Save and Return to Test Screen**

Once all the information lines show the desired identification, use  to save and return to the test.

### PRIMING OVERVIEW

This section covers how to prime the unit prior to running a Flow, Flow--PCA or Distal Occlusion test using the Infusion Analyzer. Only Distilled Water can be used with this unit. Do not use tap water, glucose or any other fluid; this will cause the interior tubing to become unclean.

For Maximum Accuracy, all air must be cleared from the unit. This is best done by a high flow rate which is easily obtained with firm pressure on the priming syringe.




The following is an outline of the steps that are involved in priming the unit:

**PRIMING**

- Begin from a Prime Channel Screen
- Attach an External Inlet Valve
- Attach Priming Syringe to the Valve
- Open Valve and Forcefully Inject 50 ml of Distilled Water
- Close Valve and Remove Priming Syringe
- Press Start Key to Set the Prime
- Clear air from Device Under Test (DUT) Tubing
- Connect DUT Tubing Insuring there are No Bubbles
- Run 10 mL of Distilled Water through DUT and Module



**PRIMING****STEP 1** ➤**Begin from a Channel Screen**

A Module can be primed when the unit displays the Prime screen for that Channel. Use  to toggle to the desired prime screen.



**CHANNEL 1      IDLE**  
**PRIME WITH 50mL**  
**THEN PRESS START**

**STEP 2** ➤**Attach an External Inlet Valve**

To help prevent air from being injected into the Module during Priming and Testing, attach a Valve to the Fluid In Luer Lock of the Module. This Valve will be used to minimize the risk of air being added to the system and will help maintain Prime, making it unnecessary to prime before every test.

**STEP 3** ➤**NOTE:**

•Only Distilled Water can be used with this unit. Do not use tap water, glucose or any other fluid; this will cause the interior tubing to become unclean.

**Attach a Priming Syringe to the Valve**

Attach a syringe filled with 50 mL of Distilled Water to the Valve.

**STEP 4 ➤****NOTE:**

•For Maximum Accuracy, all air must be cleared from the unit. This is best done by a high flow rate which is easily obtained with firm pressure on the priming syringe.


**Open Valve, Forcefully Inject Distilled Water**

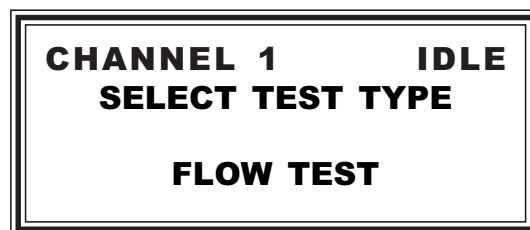
Open Valve and forcefully inject 50 mL of Distilled Water. If more than one syringe full of water is required, close valve between fills. Take care not to inject air into the unit.

**STEP 5 ➤****Close Valve and Remove Priming Syringe**

Once the 50 mL of Distilled Water is injected into the Module, close the Valve and remove the syringe.

**STEP 6 ➤****Press Start Key to Set the Prime**

As prompted, use  to set the prime and go to the test selection screen.



Before selecting test, prepare and attach the DUT following steps 7 through 9 to insure proper connection.

**STEP 7 ➤****Clear Air from the DUT Tubing**

Run the Device Under Test (DUT) to clear air from its tubing before connecting it to the Module for testing.

**STEP 8 ➤****Connect DUT to Valve**

Connect the DUT tubing to the Valve, insuring that there are no bubbles in the line.

**STEP 9 ➤****Run 10 mL of Distilled Water through DUT**

For maximum accuracy, run 10 mL of Distilled Water through the DUT and Module prior to beginning a test.

### **PURGING OVERVIEW**

This section covers how to Purge the unit after use. Only Distilled Water is to be used in the system; this should keep it clean. However, if no fluid tests are going to be run for a period of more than 24 hours, the water must be blown out of the unit to maintain the necessary cleanliness.

The following is an outline of the steps that are involved in purging the unit:

#### **PURGING**

- **Attach Clean Dry Air (CDA) or N<sub>2</sub> Line to Fluid In on Module**
- **Allow CDA or N<sub>2</sub> to Flow at 20 PSI for At Least One Minute**
- **Move Line to Fluid Out on Module**
- **Go Into User Setup Mode**
- **Set Air Purge Parameter to On**
- **Wait at Least 2 Minutes Before Removing Line**

**PURGING****STEP 1** ➤**Attach CDA or N<sub>2</sub> Line to Fluid In on Module**

A Clean Dry Air (CDA) or N<sub>2</sub> line is used at 20 PSI to purge the Module of water if no fluid tests are going to be run for a period of more than 24 hours.

**STEP 2** ➤**NOTE:**

•One minute is the absolute minimum flow time for effective purging. There is no maximum limit.

**Allow CDA or N<sub>2</sub> Line to Flow at 20 PSI for At Least One Minute**

Turn on the flow of CDA or N<sub>2</sub> for at least one minute.

**STEP 3** ➤**Move Line to Fluid Out on Module**

Turn off the flow of CDA or N<sub>2</sub> and move the line to the outlet.  
Turn on the flow.

**STEP 4** ➤**Go into User Setup Mode**

From Main Screen, Enter Setup Screen, Enter the Access Code for User Setup for the system, View Setup Parameters.  
(See **USER SETUP** for details.)

**STEP 5** ➤**Set Air Purge Parameter to On**

Go into Edit Mode, Use  to turn the Air Purge On.  
(See **USER SETUP** for details.)

### STEP 6 ➤

#### NOTE:

•A small amount of water will come out the vent port on the bottom of the unit during this step.

### Wait at least 2 Minutes before Removing Line

Air Purge will run for the first 60 seconds in one configuration and then automatically switch to a second configuration. Wait at least 2 minutes for both purging configurations to run before removing the line.

**DATALOG OVERVIEW**

The Datalogger is used to store data as it becomes available in the system. There are separate Datalogs for Channel 1, Channel 2 and the Safety Analyzer. For Channel 1 and Channel 2, the type of test determines when data is available. For Distal Occlusion tests, data is available every second. For Flow tests, flow rate affects when data is available. The slower the flow rate, the more time between available data. For the Safety Analyzer, data is available at the end of each Automatic test.

For Flow and Distal Occlusion tests, the amount of data stored during an extended test period may fill the Datalogger. When the Datalogger becomes full, new data is written over existing data, beginning with the oldest record. A special function has been incorporated into the system to restrict how often available data is stored in the Datalog. For example, when running a 6 hour Flow test, it may only be of interest to store data every 10 seconds. To do this, the LOG INTERVAL parameter would be set to MANUAL and the LOG DATA EVERY parameter would be set to 00:10 (See **USER SETUP** for details). In this mode, the data would be stored as it becomes available,

## NOTE:

•This sample shows how the Log Interval and Log Data Every parameters in USER SETUP can affect when data is stored in the Datalog for a sample test.

PAGE 01				
BC GROUP IPA-2000S INFUSION PUMP ANALYZER				
PUMP INFORMATION:				
MANUFACTURER:	Manufacturer 1	MODEL:	Pump 1	
SERIAL NUMBER:	1001			
DEPARTMENT:	SURGERY	LOCATION:	Hospital 1	
TEST STARTED AT: 7:13:26 ON 7/17/02				
CHANNEL 1 FLOW RATE TEST				
ELAPSED	FLOW	AVG FLOW	VOLUME	PRESSURE
TIME	mL/hr	mL/hr	mL	PSI
0:00:10	35.6	36.0	.10	5.8
0:00:21	35.0	34.2	.20	5.9
0:00:31	35.4	34.8	.30	5.8
0:00:42	34.6	35.1	.41	5.8
0:00:52	36.1	35.3	.51	5.8
0:01:05	28.1	34.3	.62	5.8
END OF DATA				
CHANNEL 1 FLOW RATE SUMMARY				
TOTAL TIME	0:01:05			
TOTAL VOLUME	.62mL			
AVERAGE FLOW	34.3mL/hr			
BACK PRESSURE	5.8PSI			

but only one datapoint would be stored every 10 seconds.  
(See example report on next page.)

When using the Manual Datalog interval with the Nurse Call feature of the Distal Occlusion test, the system will store three datapoints to the Datalog after the occurrence of the Nurse Call input. Therefore, the Distal Occlusion test will not automatically stop for three times the duration of the LOG DATA EVERY parameter. This is done to verify that the pressure drops, indicating the pump has turned off, after the Nurse Call input.

Samples of Datalogs for each test type as well as detailed instructions for manipulating the Datalogs can be found within each test section of this manual.

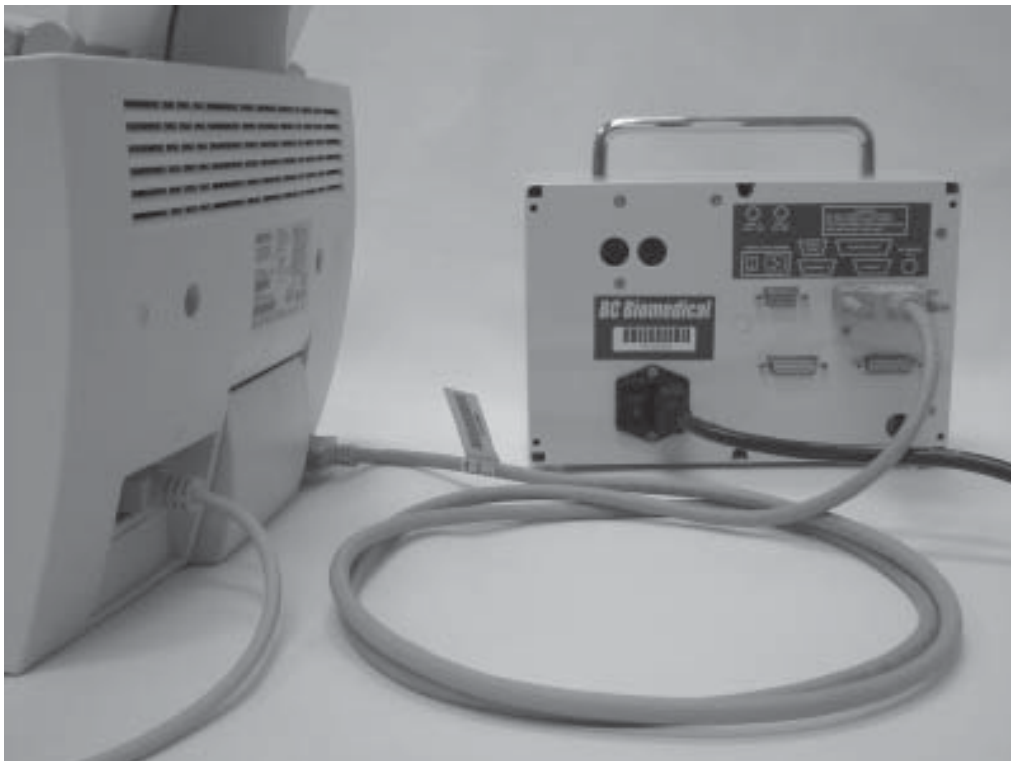


## PRINTING REPORTS

### PRINTING REPORTS OVERVIEW

This section covers how to print reports. The Print Mode can be set so reports automatically print upon the conclusion of each test and/or reports can be manually printed later from individual Datalog screens. The report can contain summary information, data information or both. Additionally, the Print All parameter in the User Stack provides another technique, allowing all saved Datalogs to be printed at once.

This section begins with an overview for automatically printing reports, then progresses through step-by-step instructions for manually printing reports.



## PRINTING REPORTS

### AUTOMATICALLY PRINTING REPORTS

The following is an outline of the steps that are involved in automatically printing reports for a test.

#### **PRINTING REPORTS**

##### **•Set Desired Printing Setup Parameters**

#### **STEP 1** ➤

##### **NOTES:**

- There are two modes available as printing options, Manual and Automatic (Summary, Data or Both).*
- When PRINT MODE is set to SUMMARY, DATA or BOTH, the appropriate report will automatically print the selected type when a test is completed.*
- PRINT PORT can be set to serial, parallel or none. If set to none, a message will display requesting a port be selected before printing will occur.*
- When the port is set to parallel, the unit needs to be connected to a parallel printer or the Printer Not Ready alarm will sound. (See **ALARMS** for more details.)*

#### **Set Desired Printing Setup Parameters**

When and in what format a report is printed are set using the parameters found in the User Stack of the Setup screens. Choose the PRINT MODE, PRINT PORT, PRINT FORMAT and whether all Datalogs are to be printed.

(See **USER SETUP** for more details.)

## **PRINTING REPORTS**

### **MANUALLY PRINTING REPORTS OVERVIEW**

The following is an outline of the steps that are involved in manually printing reports for a test.

#### **PRINTING REPORTS**

- Set Desired Printing Setup Parameters
- Go to a Datalog Screen
- Print the Desired Report
- Return to Datalog Screen

# PRINTING REPORTS

## MANUALLY PRINTING REPORTS

### STEP 1 ➤

#### NOTES:

- There are two modes available as printing options, Manual and Automatic (Summary, Data or Both).
- When PRINT MODE is set to Manual in User Setup, reports can be printed from Datalog screens for individual tests.
- PRINT PORT can be set to serial, parallel or none. If set to none, a message will display requesting a port be selected before printing will occur.

### Set Desired Printing Setup Parameters

When and in what format a report is printed are set using the parameters found in the User Stack of the Setup screens. Choose the PRINT MODE, PRINT PORT, PRINT FORMAT and whether all Datalogs are to be printed.



(See **USER SETUP** for more details.)

### STEP 2 ➤

#### NOTES:

- All saved Datalogs are accessible from the Main Screen.
- Datalogs are accessible through the individual channels only when modules are connected.
- The Print Mode determines whether the report will contain Summary Information, Data or Both and is chosen from the Datalog Edit screen. (See **DATALOG** for more details.)

### Go to a Datalog Screen

From the Main Screen or a channel screen, use  to enter the Datalog screens. Use  to toggle between the channels.

<b>CHAN1 DATALOG- VIEW</b>
<b>RECORD TYPE      FLOW</b>
<b>PRINT SUMMARY &amp; DATA</b>
<b>RECORD NUMBER      01</b>

Using the Datalog View and Edit screens, select the individual record type, print mode and record number to be printed. (See **DATALOG** for more details.)


## PRINTING REPORTS

### STEP 3 ➤

#### NOTES:

•If a printer is not connected to the parallel port, a System Alarm will sound indicating Printer Not Ready. (See **ALARMS** for details.)

### Print the Desired Report

From the desired Datalog Screen, use  to print the report.

**PRINTING IN PROGRESS**

### STEP 4 ➤

### Return to Datalog Screen

Once the report has been sent to the printer port, the unit will automatically return to the same Datalog so that other reports can be printed.

**CHAN1 DATALOG- VIEW  
RECORD TYPE FLOW  
PRINT SUMMARY & DATA  
RECORD NUMBER 01**

### SYSTEM MEMORY OVERVIEW

Various types of information are saved in the system, using different types of memory.

The program that runs the unit is stored in Flash memory. This allows it to be field upgraded via the RS232 Port. The Datalog, User, Administrator and Factory parameters are saved in EEPROM memory. This is a permanent memory (10 years minimum life) that maintains the values, even when the power is off.

These saves occur automatically at various points in the program and there is a short wait (1-2 seconds) while this save is taking place. When active, the Save Mode screen will appear.




The Model information and Datalog data is stored in battery backed up RAM. This is a permanent memory (10 year minimum life) that maintains the data, even with the power off. The saving of this data is very fast and completely under program control so no display indications are given.


### ALARM OVERVIEW

This section covers alarms that may sound during testing procedures. It includes a list of possible alarms, explanations and the actions taken by the system.

If an alarm is sounded during operation of the unit, an Alarm Screen will appear. For example, if a bubble is detected in the fluid flow, the following screen will appear, an audio alarm will sound and the test will be terminated.



Press  to silence the audio portion of the alarm.

Press  again to clear the visual portion of the alarm and return to the IDLE or VIEW screen associated with the mode the unit was working in when detecting the alarm state.


Most alarm states terminate the tests because further data could be invalid. The alarm state should be cleared and the test rerun. The data collected prior to the alarm is still recorded in the datalogger for that test. If an alarm only pauses a test, the system will autostart when the alarm state is cleared.

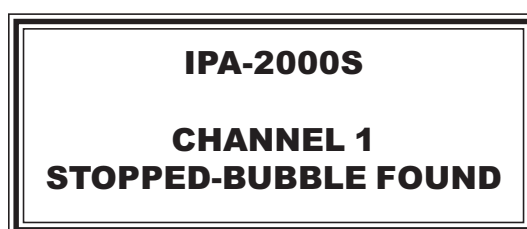
## ALARMS

The following is a table showing descriptions and actions for possible alarms:

ALARM	DESCRIPTION	ALARM ACTION
STOPPED-BUBBLE FOUND	Bubble detected in fluid flow.	Test Terminated
NURSE CALL	Nurse Call Input used. (Used to auto-stop test)	Distal Occlusion Test Stopped
STOPPED--DATALOG FULL	Datalogger for that device (Channel 1, Channel 2 or Safety Analyzer) is full. (Prevents overwriting)	Test Terminated
HIGH GROUND RESISTANCE	Safety Analyzer DUT power cord is above ground resistance level. (During Automatic Test)	Test Paused at current step until below limit
HIGH LEAKAGE CURRENT	Safety Analyzer Leakage test Fails. (During Automatic Test)	Test Terminated (Datalog records settings which caused alarm.)
LOAD CURRENT OVER 8A	DUT current exceeded test receptacle rating of 8 amps.	Test Terminated
FUSE 1 IS OPEN FUSE 2 IS OPEN	Fuse 1 or 2 failed in back panel.	Test Terminated
INVALID LINE WIRING	Incoming line wiring is incorrect. (Constantly monitored)	Start Locked Out (LEDs flash and alarm resounds if try to start test)
INVALID LINE VOLTAGE	Incoming Line Voltage is out of specifications. (108.0 V to 145.2 V)	Test Terminated Start Locked Out
DUT NOT TURNED ON	DUT power was not turned on when requested during Safety Analyzer Automatic test.	Test Paused until DUT power turned on.
CPU FAILURE	Internal microprocessor system failure (If alarm persists, unit must be returned to factory.)	Terminates System
PRINTER NOT READY	Printer not detected or not ready.	Cancels Print Jobs
DEMO PERIOD OVER	Limit of DEMO tests set by factory reached. (Consult factory)	Tests Locked Out



Alarms that are silenced but still present can be viewed from the Main Screen. Press  to scroll through alarms from the Main Screen. The first line of the alarm displays the device for which the alarm sounded (Channel 1, Channel 2, Safety Analyzer, System). The second line displays the specific alarm message.



A special feature is incorporated to automatically scroll through active alarms in the Main Screen. The ALARM SCAN parameter in the USER SETUP determines the rate at which active alarms are automatically scrolled in the Main Screen. (See **USER SETUP** for details.)

**BUBBLE RECOVERY NOTE:**

•When bubbles are detected in the system, an automatic bubble recovery routine will attempt to clear them. The display will indicate that the system is in the Bubble Recovery Mode. Allow the fluid to continue to flow during this process. When the bubbles are cleared, it is advisable to run a short test to insure proper operation.

•In most cases, it is better to simply Purge and Prime again (See **PURGING** and **PRIMING** for details), being certain that no bubbles get into the unit. This will insure maximum accuracy and reliability.

**FLASH OVERVIEW**

The program that runs the unit is stored in Flash memory and can be field upgraded via the RS232 Port. A Flash Downloader can be installed to an on-site computer and updated programs can be downloaded from the web and flashed into the unit. This section begins with an overview then progresses through step-by-step instructions for updating the program.

The following is an outline of the steps that are involved in flashing an updated program into the unit.

**FLASHING FILES**

- Goto FTP Website
- Download Flash Programmer
- Install Flash Programmer
- Download Updated Program File
- Setup the Unit for Flash Programming
- Connect an RS232 Cable
- Start the Flash Program
- Verify Com Port Setup
- Select Display Mode
- Prepare to Download
  - or
  - Enable Programming
  - Erase Micro
  - Enable Programming
- Select File to Download
- Download Updated File
- Complete Flashing Process

## FLASHING FILES

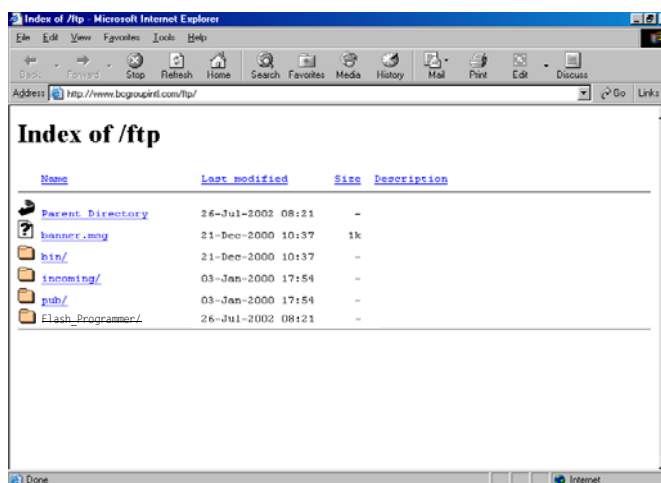
### STEP 1 ➤

#### NOTE:

•If the Flash Programmer has already been downloaded, go to Step 4.

### Go to FTP Website

The Flash Programmer can be found on the internet at <http://www.bcgrouppintl.com/ftp/> within the Flash Programmer.file.



### STEP 2 ➤

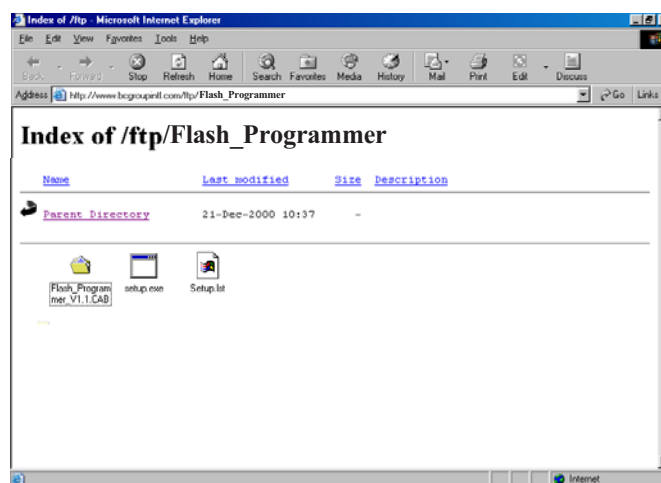
#### NOTE:

•There are three files in the Flash Programmer Folder:

Flash\_Programmer\_V\*.\*.cab  
Setup.exe  
Setup.lst

### Download Flash Programmer

Double click to download the files to the on-site computer.

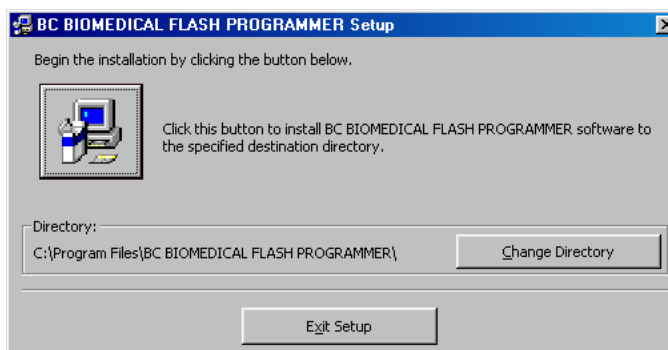


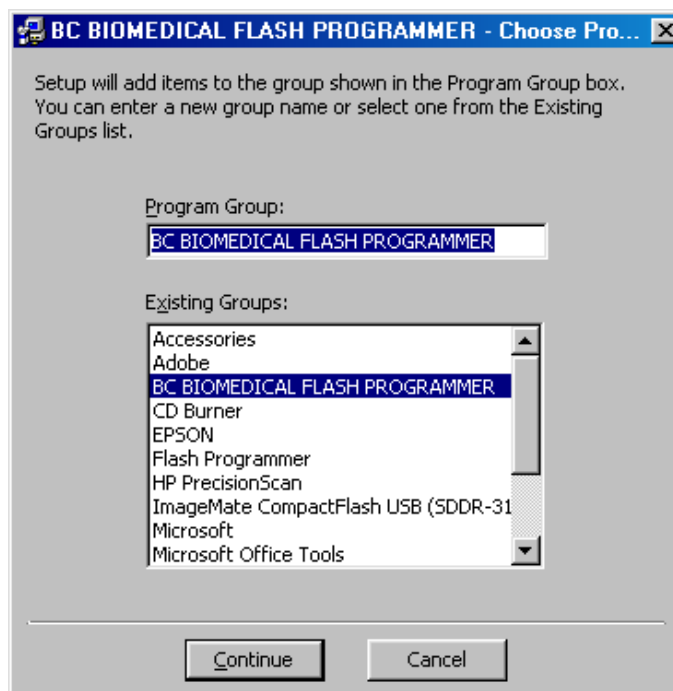
**STEP 3** ➤**NOTE:**

•By following the default installation options, the Flash Programmer should be able to be run from the Start menu: Start/Programs/Flash Programmer.

**Install Flash Programmer**

Run the Setup.exe file to install the Flash Programmer onto the on-site computer.





**STEP 3** ➤**NOTES:**

- By following the default installation options, the Flash Programmer should be able to be run from the Start menu: Start/Programs/Flash Programmer.
- The program will typically be downloaded via email, an internet site or a hard copy.

**Download Updated Program File**

Obtain the updated program to be flashed and download it to a temporary location on the on-site computer with the Flash Programmer.

**STEP 4** ➤**Setup the Unit for Flash Programming**

From the Main Screen, enter the User Setup mode of the unit and set the Baud Rate to 115200.

(See **USER SETUP** for details.)

<b>USER SETUP</b>	-	<b>VIEW</b>
<b>BAUD RATE</b>		<b>115200</b>
<b>PRINT MODE</b>		<b>BOTH</b>
<b>PRINT FORMAT</b>		<b>PARALLEL</b>

**STEP 5** ➤**Connect an RS232 Cable**

Connect an RS232 Cable from the on-site computer to the RS232 port on the back of the unit.

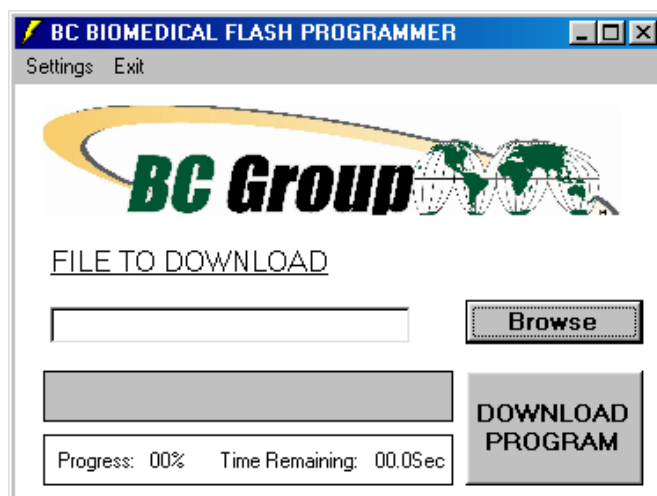
**STEP 6** ➤**Start the Flash Program****NOTE:**

On the on-site computer, start the Flash Programmer.

•The Flash Programmer should be able to be run from the Start menu: Start/Programs/Flash Programmer.

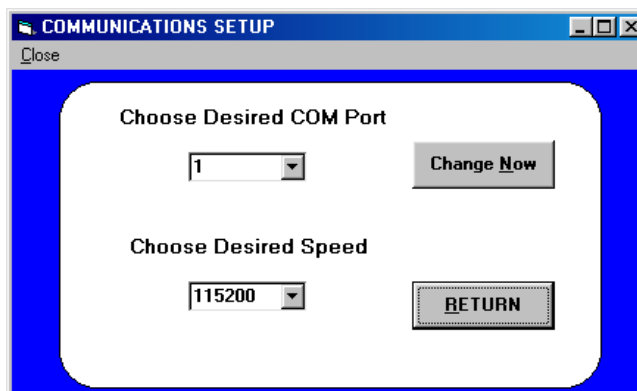
**AVAILABLE SETTINGS OPTIONS**

**Com Port**  
**Display Mode** ▶  
**Save Settings on Exit**

**STEP 7** ➤**Verify Com Port Setup****NOTE:**

From the Settings Option in the Flash Programmer window, select Com Port to enter the Communications Setup screen.

•The Com Port number is determined by what port the RS232 cable is connected to on the on-site computer.



Verify the COM Port is correct and the Desired Speed is 115200. Change any information if necessary.

Click Return to go back to the Flash Programmer screen.



**STEP 8** ➤**NOTE:**

•The Normal Mode gives a “no click” option. The Advanced Mode gives feedback on all the individual steps that make up the downloading.

**Select Display Mode**

There are two display modes to choose from when downloading a file. The Normal Mode automatically replaces the program in the unit (see Step 9). The Advanced Mode specifically steps through enabling, erasing and downloading (see Steps 9a through 9c).

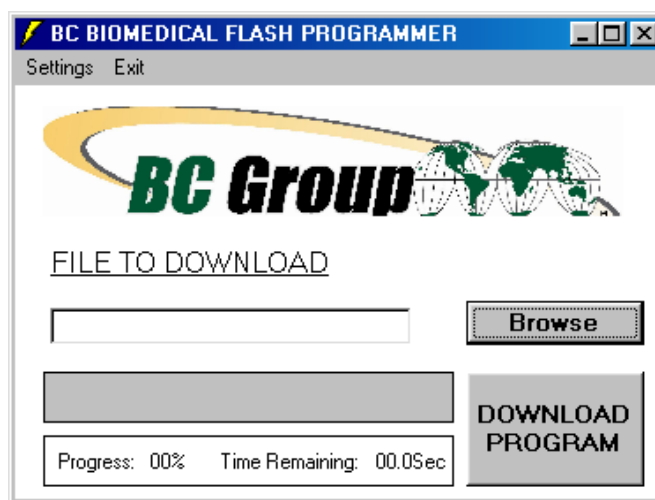
Select the desired display mode from the pull down list in the Settings Options of the Flash Programmer Screen.

**STEP 9** ➤**NOTE:**

•For the Normal Display Mode, no extra preparation is required.

**Prepare to Download**

If the Normal Display Mode is chosen, continue to Step 10.

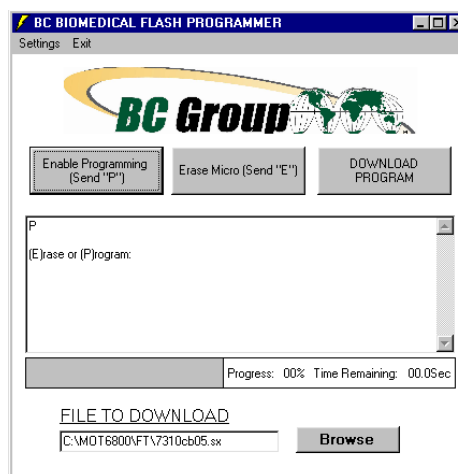


**STEP 9a** ➤**NOTE:**

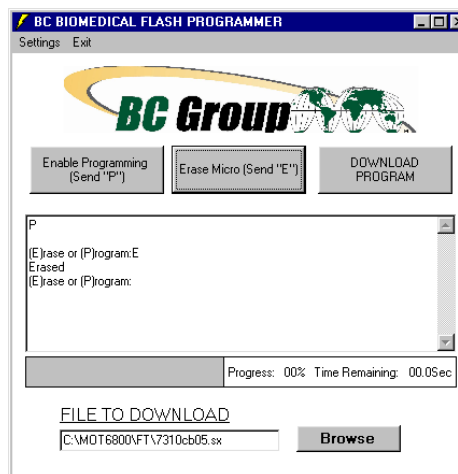
•The Advanced Mode has three steps (9a-9c) to prepare for downloading a program.

**Enable Programming**

From the Advanced Display Mode, click on the Enable Programming button to enable Flash Programming. A “P” will be displayed, followed by an “(E)rase or (P)rogram” prompt.

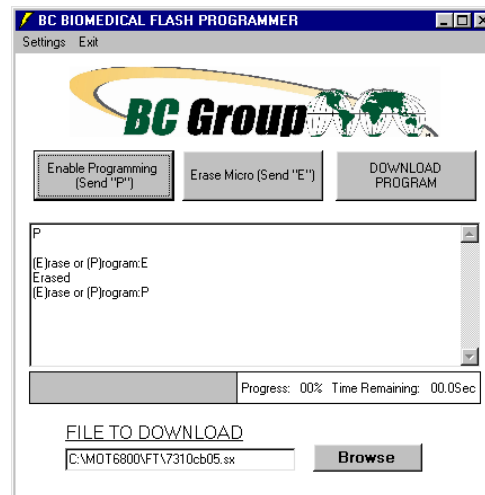
**STEP 9b** ➤**Erase Micro**

Click on the Erase Micro button to erase the current program in the unit; an “E” will be displayed. After a few seconds (3-5), the status “Erased” should be displayed followed by an “(E)rase or (P)rogram” prompt.



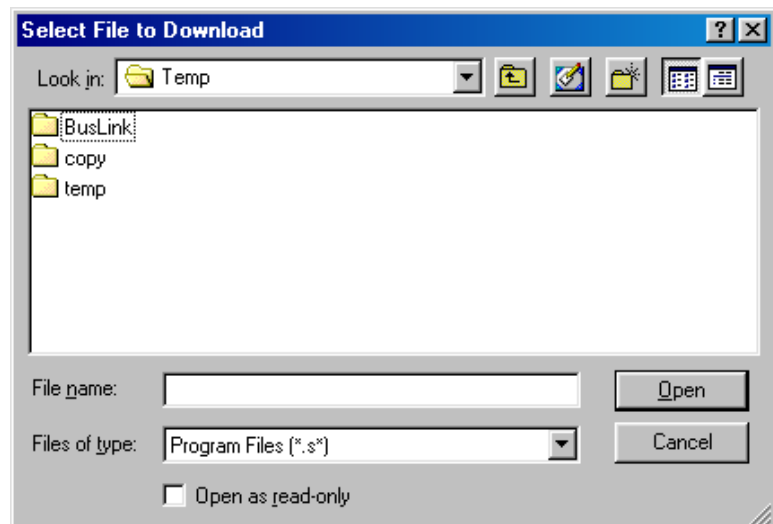
**STEP 9c** ➤**Enable Programming**

Click on the Enable Programming button again to setup the file transfer. A “P” will be displayed.

**STEP 10** ➤**Select File to Download**

Click Browse on the Flash Programmer Screen.

Locate the Updated Program File from Step 3.



## STEP 11 ➤

### NOTE:

•During programming the Download Program button will be disabled and the mouse icon will turn into an hourglass.

## STEP 12 ➤

### NOTE:

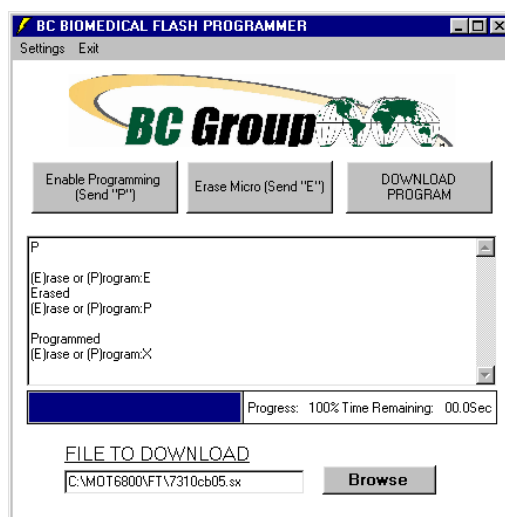
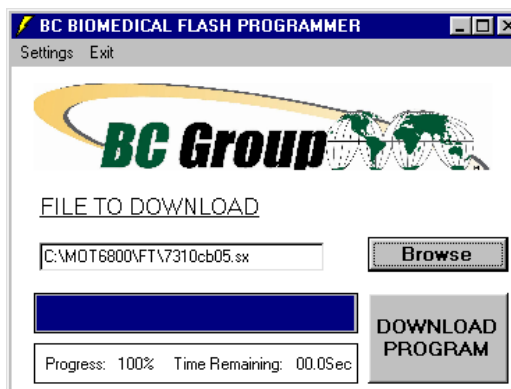
•When programming is complete the Download Program button will be enabled and the mouse icon will turn back into a pointer.

## Download Updated File

Click Download Program on either Display Screen to begin the flash programming. During Programming, the Progress and Time Remaining will indicate the status of the download.

## Complete Flashing Process

When the progress reaches 100%, indicating the updated file has downloaded completely, the unit will reset with the new program running.



Exit the Flash Programmer.

### **PART 3 : INFUSION ANALYZER--FLOW**

There are two basic types of flow tests that may be run:  
Flow and Flow--PCA.

In the standard Flow test, a continuous flow is assumed and the data is recorded on a continuous time basis.

In the Flow--PCA test, the system monitors for Bolus flow. It records the flow verses time, but calculates the average flow only during the Bolus period. It also records the lockout time between flows.

A tracking algorithm allows Bolus times with pulsatile segments to be handled, by analyzing each sub-pulse and adjusting the test timing accordingly.

The system can also pulse the Patient Control during the lockout to confirm operation and lockout performance.

Included are:

- An overview and step by step instructions for running a Flow test
- An overview and step by step instructions for running a Flow--PCA test
- Details for using the Datalog

## INFUSION ANALYZER-FLOW

### FLOW TEST OVERVIEW

This section covers how to run a Flow test. It begins with an overview and then progresses through step-by-step instructions for running the test. The test records data and reports average flow, total volume, elapsed time and back pressure.



The following is an outline of the steps that are involved in performing an Infusion Analyzer Flow test.

### **GETTING READY FOR A FLOW TEST**

- Choose Channel Screen
- Connect and Prime Device
- Choose Test
- Choose Model of Unit Being Tested

### **RUNNING A FLOW TEST**


- Begin Test
- Test Active
- Stop the Test
- View Datalog

# INFUSION ANALYZER-FLOW

## GETTING READY FOR A TEST

### STEP 1 ➤

#### Choose Channel Screen

To run a test, toggle to the appropriate Channel screen using .

#### NOTES:

- There can be up to two modules connected to the analyzer.
- The modules are interchangeable and the unit will run with a single module connected to either port.
- The Channel 1 or 2 screens will only be displayed when the modules are connected to those ports.
- These instructions will utilize Channel 1 for examples; Channel 2 functions identically.



### STEP 2 ➤

#### Connect and Prime Device

Connect device under test (DUT) to the unit and prime the channel. (See **PRIMING** for details.)

#### NOTES:



- The **NORMAL LED** on the remote module will blink at a rate of twice per second, when a channel needs to be primed.
- As the channel becomes ready, the **NORMAL LED** on the remote module will blink at a rate of once per second.
- The priming message will not display if the DUT is already primed.



## INFUSION ANALYZER-FLOW

### STEP 3 ➤


#### Choose Test

Scroll to FLOW test using  .

<b>CHANNEL 1</b>	<b>IDLE</b>
<b>SELECT TEST TYPE</b>	
<b>FLOW TEST</b>	

### STEP 4 ➤

#### Choose Model of Unit Being Tested

Use  to go to MODEL VIEW screen to enter Manufacturer, Model, Serial Number, Department and Location. (See **MODEL SELECTION** for details.)


#### **NOTES:**

*\*Each test is identified by time, date and record number.*

*\*A test's identification can be further enhanced by entering model and location information to be included in the Datalogger and printouts.*

*\*This step is optional and can be bypassed by simply moving on to the next step.*

<b>CHANNEL 1 MODEL -VIEW</b>	
<b>MANUF:</b>	<b>ABC</b>
<b>MODEL:</b>	<b>123A</b>
<b>S/N:</b>	<b>12345</b>

From the MODEL VIEW screen, use  to return to the test.

# INFUSION ANALYZER-FLOW

## RUNNING A FLOW TEST

### STEP 1 ➤

#### Begin Test

Press  to begin the FLOW test.

#### NOTE:

•This screen will be displayed until flow is detected.

WAITING FOR FLOW	
AVG FLOW	0.0mL/hr
TOTAL VOL	.00mL
ELAPSED TIME	00:00:00

### STEP 2 ➤

#### Test Active

The test will auto start when the unit finds flow.

Throughout the duration of the test, data will update and display.

#### NOTES:

•Use   to scroll the available data.

•The screen displays any three consecutive data lines.

#### AVAILABLE FLOW TEST DATA


INST FLOW	00.0mL/hr
AVG FLOW	00.0mL/hr
TOTAL VOL	0.00mL
ELAPSED	TIME

CHANNEL 1	FLOW
AVG FLOW	0.0mL/hr
TOTAL VOL	.00mL
ELAPSED TIME	00:00:00

## INFUSION ANALYZER—FLOW

### STEP 3 ➤

#### Stop the Test

Press  when the test is completed.

### STEP 4 ➤

#### View Datalog


When the test is completed, the screen will automatically change to display the Datalog for the test.

(See **DATALOG--FLOW TEST** for details.)

#### **NOTES:**

- Datalogs are stored and can be printed out at any time.
  - If Autoprint is selected, the printout will automatically print when the test is completed.
- (See **USER SETUP** for details.)

CHANNEL 1	DATALOG
AVG FLOW	0.0mL/hr
TOTAL VOL	.00mL
ELAPSED TIME	00:00:00

If a printer is connected, use  to get the printout of the current test's Datalog.

# INFUSION ANALYZER-FLOW

## DATALOG SAMPLE FOR A FLOW TEST

### NOTES:

•This sample shows both summary and data information.

•There are three options for the form of the report: Summary, Data Points or Summary and Data.

•This option can be selected from the Datalog screen.

•This sample report has been compressed, with intermediate data points removed for easier viewing.

•This sample report shows the optional blank lines in the header for the manual entry of pump information. If chosen in the model selection prior to running the test, these lines would contain printed information. (See **MODEL SELECTION** for details.)

•(See **DATALOG--FLOW TEST** for details.)

PAGE 01

BC GROUP  
IPA-2000 INFUSION PUMP ANALYZER

#### PUMP INFORMATION:

MANUFACTURER: \_\_\_\_\_ MODEL: \_\_\_\_\_

SERIAL NUMBER: \_\_\_\_\_

DEPARTMENT: \_\_\_\_\_ LOCATION: \_\_\_\_\_

TEST STARTED AT: 12:31:47 ON 6/27/02

CHANNEL 1	FLOW RATE TEST			
ELAPSED TIME	FLOW mL/hr	AVG FLOW mL/hr	VOLUME mL	PRESSURE PSI
0:00:11	105.6	88.3	.27	0.0
0:00:20	58.0	77.4	.43	0.0
0:00:32	80.9	78.7	.70	0.0
0:00:40	59.1	78.3	.87	0.0
0:00:51	105.6	79.7	1.13	0.0
0:01:00	81.4	79.8	1.33	0.0
0:01:11	93.8	79.6	1.57	0.0
0:01:22	99.4	82.0	1.87	0.0
0:01:31	55.0	81.4	2.06	0.0
0:01:42	91.3	84.7	2.40	0.0
0:01:50	99.4	85.7	2.62	0.0
0:02:02	99.4	86.1	2.92	0.0
0:02:10	91.3	87.2	3.15	0.0
0:02:22	81.1	86.7	3.42	0.0
0:02:31	80.1	86.0	3.61	0.0
0:02:43	80.9	85.6	3.88	0.0
0:02:52	45.3	84.5	4.04	0.0
0:03:00	58.2	84.8	4.24	0.0
0:03:11	116.5	85.3	4.53	0.0
0:03:22	143.5	87.1	4.89	0.0
0:03:31	91.3	87.8	5.15	0.0
0:03:42	91.3	89.5	5.52	0.0
0:03:51	143.5	90.5	5.81	0.0
0:04:02	144.0	91.9	6.18	0.0
0:04:10	91.6	92.5	6.43	0.0
0:04:20	116.5	93.1	6.73	0.0
0:04:31	152.5	93.7	7.06	0.0
0:04:41	153.7	94.8	7.40	0.0
0:04:52	153.7	94.9	7.70	0.0
0:05:02	150.1	96.1	8.07	0.0
.	.	.	.	.
.	.	.	.	.
0:14:21	131.8	99.0	23.70	0.0
0:14:32	131.8	99.6	24.13	0.0
0:14:41	117.5	99.9	24.46	0.0
0:14:50	106.0	99.9	24.72	0.0
0:15:01	106.0	99.8	24.99	0.0

END OF DATA

CHANNEL 1	FLOW RATE SUMMARY
TOTAL TIME	0:15:01
TOTAL VOLUME	24.99mL
AVERAGE FLOW	99.8mL/hr
BACK PRESSURE	0.0PSI

## INFUSION ANALYZER--FLOW--PCA

### FLOW--PCA TEST OVERVIEW

This section covers how to run a Flow--PCA test. It begins with an overview and then progresses through step-by-step instructions for running the test. The test is the same as the Flow test with the addition of the connection of an (optional) PCA output which allows the unit to simulate patient request when there is no flow. The test records data and reports average flow, total volume, elapsed time and back pressure, as well as, individual Bolus data and lockout times, average Bolus flow, average Bolus volume, average lockout time and number of deliveries.



## **INFUSION ANALYZER--FLOW--PCA**

The following is an outline of the steps that are involved in performing an Infusion Analyzer Flow--PCA test.

### **GETTING READY FOR A FLOW--PCA TEST**

- Choose Channel Screen
- Connect and Prime Device
- Choose Test
- Choose Model of Unit Being Tested

### **RUNNING A FLOW--PCA TEST**


- Begin Test
- Test With Bolus Active
- Test With Lockout Active
- Stop the Test
- View Datalog

# INFUSION ANALYZER–FLOW

## GETTING READY FOR A FLOW–PCA TEST

### STEP 1 ➤

#### Choose Channel Screen

To run a test, toggle to the appropriate Channel screen using  .

#### **NOTES:**

- There can be up to two modules connected to the analyzer.
- The modules are interchangeable and the unit will run with a single module connected to either port.
- The Channel 1 or 2 screens will only be displayed when the modules are connected to those ports.
- These instructions will utilize Channel 1 for examples; Channel 2 functions identically.



**CHANNEL 1      IDLE**  
**PRIME WITH 50 mL**  
**THEN PRESS START**

### STEP 2 ➤

#### Connect and Prime Device

Connect device under test (DUT) to the unit and prime the channel. (See **PRIMING** for details.)

#### **NOTES:**



- The **NORMAL LED** on the remote module will blink at a rate of twice per second, when a channel needs to be primed.
- As the channel becomes ready, the **NORMAL LED** on the remote module will blink at a rate of once per second.
- The priming message will not display if the DUT is already primed.

There is an optional PCA output for connecting the module to the PCA input of the DUT. The module will simulate patient request when there is no flow.

## INFUSION ANALYZER—FLOW

### STEP 3 ➤


#### Choose Test

Scroll to FLOW--PCA test using  .

**CHANNEL 1      IDLE**  
**SELECT TEST TYPE**  
  
**FLOW--PCA TEST**

### STEP 4 ➤

#### Choose Model of Unit Being Tested

Use  to go to MODEL VIEW screen to enter Manufacturer, Model, Serial Number, Department and Location. (See **MODEL SELECTION** for details.)


#### **NOTES:**

*\*Each test is identified by time, date and record number.*

*\*A test's identification can be further enhanced by entering model and location information to be included in the Datalogger and printouts.*

*\*This step is optional and can be bypassed by simply moving on to the next step.*

**CHANNEL 1 MODEL -VIEW**  
**MANUF:                      ABC**  
**MODEL:                     123A**  
**S/N:                         12345**

From the MODEL VIEW screen, use  to return to the test.




## INFUSION ANALYZER—FLOW

### RUNNING A FLOW--PCA TEST

#### STEP 1 ➤

##### Begin Test

Press  to begin the FLOW--PCA test.

##### NOTE:



•This screen will be displayed until flow is detected.

<b>WAITING FOR FLOW</b>	
<b>AVG FLOW</b>	<b>0.0mL/hr</b>
<b>TOTAL VOL</b>	<b>.00mL</b>
<b>ELAPSED TIME</b>	<b>00:00:00</b>

#### STEP 2 ➤

##### Test With Bolus Active

##### NOTE:

- Use   to scroll the available data.
- The screen displays any three consecutive data lines.

The test will auto start when the unit finds flow. Throughout the duration of the test, data will update and display. Data is collected for each Bolus delivered to the unit.

##### AVAILABLE FLOW TEST DATA

<b>INST FLOW</b>	<b>00.0mL/hr</b>
<b>AVG FLOW</b>	<b>00.0mL/hr</b>
<b>TOTAL VOL</b>	<b>0.00mL</b>
<b>ELAPSED TIME</b>	<b>00:00:00</b>
<b>BACK PRESS</b>	<b>0.0PSI</b>

<b>CHANNEL 1</b>	<b>FLOW-PCA</b>
<b>AVG FLOW</b>	<b>0.0mL/hr</b>
<b>TOTAL VOL</b>	<b>.00mL</b>
<b>ELAPSED TIME</b>	<b>00:00:00</b>

### STEP 3 ➤

#### Test With Lockout Active

At the end of a Bolus delivery, the PCA output is automatically activated several times per second during the Lockout period to simulate patient request. The Lockout time between Bolus deliveries is displayed and stored.


#### **NOTE:**

•The Lockout Time Screen is displayed until flow is detected, then the display returns to the Flow--PCA Data Screen.



### STEP 4 ➤

#### Stop the Test

The Flow--PCA test should be stopped during a lockout period. Press  when the test is completed.

## INFUSION ANALYZER--FLOW

### STEP 5 ➤

#### View Datalog

When the test is completed, the screen will automatically change to display the Datalog for that test.

(See **DATALOG--FLOW** for details.)


#### **NOTES:**

•Datalogs are stored and can be printed out at any time.

•If Autoprint is selected, the printout will automatically print when the test is completed.

(See **USER SETUP** for details.)

<b>CHANNEL 1</b>	<b>DATALOG</b>
<b>AVG FLOW</b>	<b>0.0mL/hr</b>
<b>TOTAL VOL</b>	<b>.00mL</b>
<b>ELAPSED TIME</b>	<b>00:00:00</b>

If a printer is connected, use  to get the printout of the current test's Datalog.

# INFUSION ANALYZER-FLOW

## DATALOG SAMPLE FOR A FLOW-PCA TEST

### NOTES:

•This sample shows both summary and data information.

•There are three options for the form of the report: Summary, Data Points or Summary and Data.

•This option can be selected from the Datalog screen.

•(See **DATALOG--FLOW TEST** for details.)

					PAGE 01
BC GROUP					
IPA-2000 INFUSION PUMP ANALYZER					
PUMP INFORMATION:					
MANUFACTURER:		MANUFACTURER A		MODEL:	PUMP MODEL 3
SERIAL NUMBER:				LOCATION:	
DEPARTMENT:					
TEST STARTED AT: 6:45:37 ON 7/01/02					
CHANNEL 2 FLOW RATE TEST					
ELAPSED	FLOW	AVG FLOW	VOLUME	PRESSURE	
TIME	ML/hr	ML/hr	ML	PSI	
0:00:04	80.7	63.0	.07	0.0	
0:00:07	110.3	92.5	.18	0.0	
0:00:11	109.4	94.9	.29	0.0	
0:00:14	110.0	102.8	.40	0.0	
0:00:18	82.4	96.0	.48	0.0	
0:00:21	105.8	99.4	.58	0.0	
0:00:25	108.4	99.3	.69	0.0	
0:00:29	108.7	99.3	.80	0.1	
0:00:32	82.4	99.0	.88	0.0	
END BOLUS NUMBER 01					
LOCKOUT TIME 04:55					
0:00:01	0.4	144.0	.04	0.1	
0:00:05	102.8	108.0	.15	0.1	
0:00:09	107.9	104.0	.26	0.1	
0:00:12	109.7	111.0	.37	0.1	
0:00:16	109.7	105.7	.47	0.1	
0:00:19	109.4	109.8	.58	0.1	
0:00:23	109.1	108.0	.69	0.1	
0:00:27	109.4	106.6	.80	0.1	
0:00:30	83.2	105.6	.88	0.0	
0:00:34	107.0	104.8	.99	0.1	
END BOLUS NUMBER 02					
LOCKOUT TIME 04:34					
0:00:02	0.5	72.0	.04	0.1	
0:00:05	108.7	108.0	.15	0.1	
0:00:09	110.0	100.0	.25	0.0	
0:00:12	98.9	99.0	.33	0.0	
0:00:14	106.3	105.4	.41	0.0	
0:00:18	109.4	102.0	.51	0.0	
0:00:21	82.7	101.1	.59	0.0	
0:00:25	107.0	100.8	.70	0.0	
0:00:28	109.7	104.1	.81	0.0	
0:00:32	109.4	103.5	.92	0.0	
END BOLUS NUMBER 03					
LOCKOUT TIME 00:00					
END OF DATA					
					PAGE 02
BOLUS TEST SUMMARY					
AVERAGE BOLUS FLOW		102.4ML/hr			
AVERAGE BOLUS VOLUME		.93ML			
AVERAGE LOCKOUT TIME		04:44			
NUMBER OF DELIVERIES		03			

### **FLOW TEST DATALOG OVERVIEW**

This section covers how to access and choose specific Infusion Analyzer Flow Datalogs. It begins with an overview and then progresses through step-by-step instructions for manipulating and using the Datalogs.

The Flow tests record the data in the Datalogger for review and/or generation of a printed report.

The Datalog and report also contain average flow, total volume, elapsed time and back pressure information for both types of tests and Bolus numbers, lockout times, average Bolus flow, average Bolus volume, average lockout time and number of deliveries for Flow--PCA tests.

The following is an outline of the steps that are involved in working with the Datalogger.

#### **WORKING WITH THE DATALOGGER**

- Enter the Datalogger
- View Flow Test Datalog
- View a Specific Record
- Go into Datalog Edit Mode
- Scroll to Desired Record Number
- Enter Choice for Record Number
- View or Print Flow Test Datalog

### FLOW TEST DATALOG

#### STEP 1 ➤

#### Enter the Datalogger

There are three ways to enter the Datalogger:

**NOTE:**

•See *STEPS 1a through 1c* for details.

- 1.) Manually from the Main Screen
- 2.) Manually from Channel 1, Channel 2 or Safety Analyzer Idle screens
- 3.) Automatically from the final screen of a Channel 1 or Channel 2

## DATALOG--FLOW TEST


### STEP 1a ➤

#### NOTE:


•All saved data is accessible from the Main Screen, even if the channel is not active.

### Enter the Datalogger From the Main Screen

<b>IPA-2000S</b>
<b>Month Day, Year</b>
<b>00:00:00</b>

Use  to enter the Datalogger.

<b>CHAN1 DATALOG- VIEW</b>
<b>RECORD TYPE      FLOW</b>
<b>PRINT SUMMARY &amp; DATA</b>
<b>RECORD NUMBER      01</b>

Use  to toggle through the Datalogs for each channel.

<b>CHAN2 DATALOG- VIEW</b>
<b>RECORD TYPE      FLOW</b>
<b>PRINT SUMMARY &amp; DATA</b>
<b>RECORD NUMBER      01</b>

<b>SAFETY DATALOG- VIEW</b>
<b>RECORD NUMBER      01</b>
<b>START TIME      00:00:00</b>
<b>START DATE      01/01/02</b>

## DATALOG-FLOW TEST

### STEP 1b ➤

#### NOTES:

•Only data for the channels which are connected is accessible.

•These instructions will utilize Channel 1 for examples; Channel 2 functions identically.

•Datalogs for these channels can be toggled to using



### Enter the Datalogger From a Test Idle Screen

Use  to toggle to the Channel 1 Idle screen.

<b>CHANNEL 1</b>	<b>IDLE</b>
<b>SELECT TEST TYPE</b>	
<b>FLOW TEST</b>	

Use  to enter the Datalogger.

<b>CHAN1 DATALOG- VIEW</b>
<b>RECORD TYPE      FLOW</b>
<b>PRINT      SUMMARY &amp; DATA</b>
<b>RECORD NUMBER      01</b>

### STEP 1c ➤

#### NOTES:

•Only data for the channels which are connected is accessible.

•These instructions will utilize Channel 1 for examples; Channel 2 functions identically.

•Datalogs for these channels can be toggled to using



### Enter the Datalogger After a Test is Complete

After a Flow test is completed, the unit will automatically go to the Datalog for that test.

<b>CHANNEL 1</b>	<b>FLOW</b>
<b>AVG FLOW</b>	<b>0.0mL/hr</b>
<b>TOTAL VOL</b>	<b>.00mL</b>
<b>ELAPSED TIME</b>	<b>00:00:00</b>

<b>CHANNEL 1</b>	<b>DATALOG</b>
<b>AVG FLOW</b>	<b>0.0mL/hr</b>
<b>TOTAL VOL</b>	<b>.00mL</b>
<b>ELAPSED TIME</b>	<b>00:00:00</b>



## DATALOG–FLOW TEST

### STEP 2 ➤

#### Go To Flow Test Datalog

If the Record Type is already FLOW, continue to Step 3.



If not, select Flow for the Record Type (See Steps 2a through 2d).

### STEP 2a ➤

#### **NOTE:**

•The selected information is indicated by the flashing cursor.

#### Scroll to Record Type Information Line

Use   to scroll to the Record Type information.

CHAN1	DATALOG-	VIEW
RECORD TYPE		OCCL
PRINT	SUMMARY & DATA	
RECORD NUMBER		01


### STEP 2b ➤

#### **NOTE:**

•In the Edit mode, the flashing line cursor will change to a box.

#### Go into Datalog Edit Mode

When the cursor is under the Record Type,



use  to enter the Edit mode.

CHAN1	DATALOG-	EDIT
RECORD TYPE		OCC
PRINT	SUMMARY & DATA	
RECORD NUMBER		01

## DATALOG-FLOW TEST

### STEP 2c ➤


#### Scroll to Record Type Flow

Use   to choose Flow for the desired Record Type.

CHAN1	DATALOG-	EDIT
RECORD TYPE		FLO
PRINT	SUMMARY & DATA	
RECORD NUMBER		01

### STEP 2d ➤

#### Enter Choice and Return to View Mode

Use  to enter the new Record Type and return to the View mode.



CHAN1	DATALOG-	VIEW
RECORD TYPE		FLOW
PRINT	SUMMARY & DATA	
RECORD NUMBER		01

## DATALOG--FLOW TEST

### STEP 3 ➤


#### View Flow Test Datalog

##### NOTES:

Use   to scroll the available information.

•The screen displays any three consecutive information lines of the record.

##### FLOW TEST DATALOG REPORT



**RECORD TYPE**  
**PRINT**  
**RECORD NUMBER**  
**START TIME**  
**START DATE**  
**MANUF:**  
**MODEL:**  
**S/N:**  
**DEPT:**  
**LOC:**

(FOR EACH DATA POINT)  
**ELAPSED TIME**  
**AVG            FLOW**  
**VOL            PRES**

**AVG FLOW**  
**TOTAL VOLUME**  
**ELAPSED TIME**  
**BACK PRESS**

<b>CHAN1</b>	<b>DATALOG-</b>	<b>VIEW</b>
<b>RECORD TYPE</b>	<b>FLOW</b>	
<b>PRINT</b>	<b>SUMMARY &amp; DATA</b>	
<b>RECORD NUMBER</b>	<b>01</b>	

•The Elapsed Time, Avg, Flow, Vol and Pres information scrolls in data sets.

•The cursor and VIEW are only displayed when there is information which can be changed to access other records.

•NO DATA AVAILABLE is displayed if there are no records.



## DATALOG-FLOW TEST

### STEP 4 ➤

#### NOTES:

- The selected information is indicated by the flashing cursor.
- The Print information can be selected by following Step 4 through Step 6 and substituting "Print" for "Record Number."
- The available options for Print are Summary, Data Points or Summary & Data.

### View a Different Record

If it is necessary to find another record, use   to scroll to the Record Number information.


<b>CHAN1 DATALOG- VIEW</b>
<b>RECORD TYPE      FLOW</b>
<b>PRINT      SUMMARY &amp; DATA</b>
<b>RECORD NUMBER      01</b>

### STEP 5 ➤

#### NOTE:

- In the Edit mode, the flashing line cursor will change to a box.

### Go into Datalog Edit Mode



When the cursor is under the Record Number, use  to enter the Edit mode.

<b>CHAN1 DATALOG- EDIT</b>
<b>RECORD TYPE      FLOW</b>
<b>PRINT      SUMMARY &amp; DATA</b>
<b>RECORD NUMBER      0</b>

## DATALOG-FLOW TEST

### STEP 6 ➤


#### Scroll to Desired Record Number

Use   to choose the desired record number for a saved Flow test.

CHAN1	DATALOG-	EDIT
RECORD TYPE		FLOW
PRINT	SUMMARY & DATA	
RECORD NUMBER		01

### STEP 7 ➤



#### Enter Choice for Record Number

Use  to enter the new Record Number and return to the View mode.


CHAN1	DATALOG-	VIEW
RECORD TYPE		FLOW
PRINT	SUMMARY & DATA	
RECORD NUMBER		02

### STEP 8 ➤

#### View or Print Flow Datalog

Use   to scroll the available information.

or

Use  to print the current Datalog.

(See **PRINTING REPORTS** for details.)

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## **INFUSION ANALYZER--OCCLUSION**

### **PART 4 : INFUSION ANALYZER--DISTAL OCCLUSION**

There are two basic types of occlusion tests that may be run:  
Distal and Proximal.

The Distal test is performed by the system by closing an internal solenoid to occlude the flow and then monitoring and recording the pressure versus time. The test is terminated either manually or, if the Nurse Call connection is made, automatically. If used, the time of the Nurse Call is noted and three additional pressure readings are taken to insure the pump turned off.

The Proximal test must be performed manually since the unit has no control over the upstream fluid path. This option is provided in the unit as a convenient timer for the test. No data is recorded in the Datalog during this test.

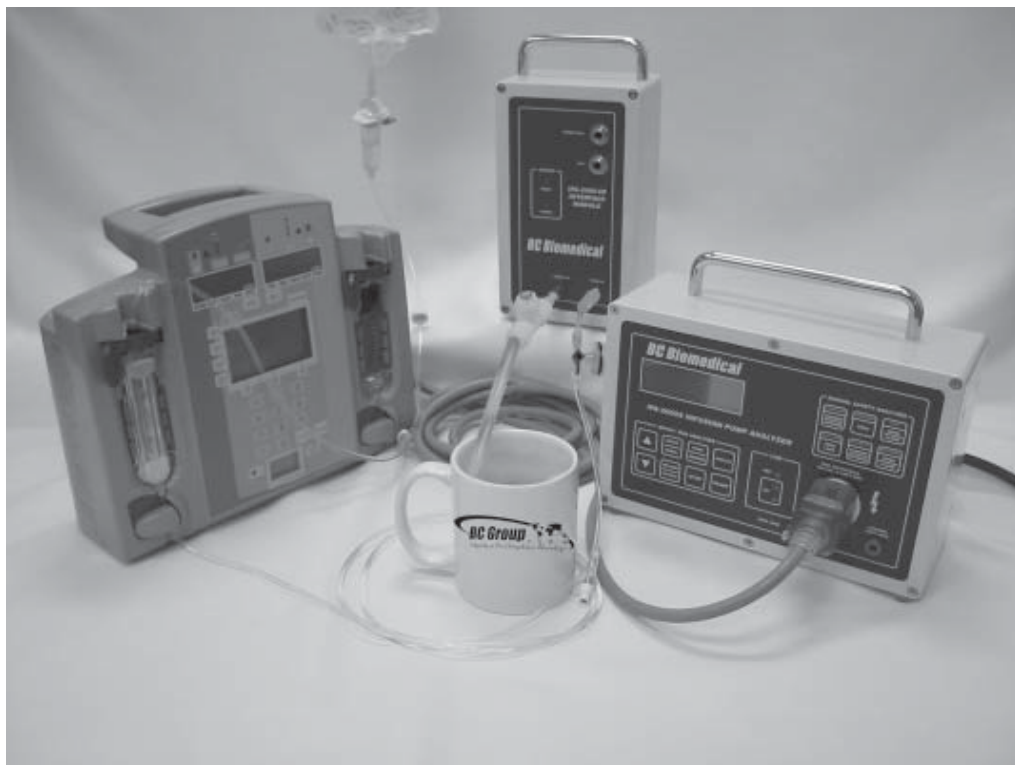
Included are:

- An overview and step by step instructions for running a Distal Occlusion test
- An overview and step by step instructions for running a Proximal Occlusion test
- Details for using the Datalog

## **INFUSION ANALYZER--OCCLUSION**

### **DISTAL OCCLUSION TEST OVERVIEW**

This section covers how to run a Distal Occlusion test. It begins with an overview and then progresses through step-by-step instructions for running the test. The test records time and pressure data as well as the maximum pressure point.





## **INFUSION ANALYZER--OCCLUSION**

The following is an outline of the steps that are involved in performing an Infusion Analyzer Distal Occlusion test.

### **GETTING READY FOR A DISTAL OCCLUSION TEST**

- Choose Channel Screen
- Connect and Prime Device
- Choose Test
- Choose Model of Unit Being Tested

### **RUNNING A DISTAL OCCLUSION TEST**


- Begin Test
- Test Active
- Stop the Test
- View Datalog

# INFUSION ANALYZER-OCCLUSION

## GETTING READY FOR A DISTAL OCCLUSION TEST

### STEP 1 ➤

#### Choose Channel Screen

To run a test, toggle to the appropriate Channel screen using .

#### **NOTES:**

- There can be up to two modules connected to the analyzer.
- The modules are interchangeable and the unit will run with a single module connected to either port.
- The Channel 1 or 2 screens will only be displayed when the modules are connected to those ports.
- These instructions will utilize Channel 1 for examples; Channel 2 functions identically.



**CHANNEL 1      IDLE**  
**PRIME WITH 50 mL**  
**THEN PRESS START**

### STEP 2 ➤

#### Connect and Prime Device

Connect device under test (DUT) to the unit and prime the channel. (See **PRIMING** for details.)

#### **NOTES:**

- The **NORMAL LED** on the remote module will blink at a rate of twice per second, when a channel needs to be primed.
- As the channel becomes ready, the **NORMAL LED** on the remote module will blink at a rate of once per second.
- The priming message will not display if the DUT is already primed.

There is an optional NURSE CALL input where the NURSE CALL output from the DUT can be connected to allow the unit to record when the DUT sends a NURSE CALL message.

## INFUSION ANALYZER-OCCLUSION

### STEP 3 ➤

#### Choose Test

Scroll to DISTAL OCCLUSION test using



.

CHANNEL 1	IDLE
SELECT TEST TYPE	
DISTAL OCCLUSION	

### STEP 4 ➤

#### Choose Model of Unit Being Tested

Use



to go to MODEL VIEW screen to enter

Manufacturer, Model, Serial Number, Department and

Location. (See **MODEL SELECTION** for details.)

#### **NOTES:**

•Each test is identified by time, date and record number.

•A test's identification can be further enhanced by entering model and location information to be included in the Datalogger and printouts.

•This step is optional and can be bypassed by simply moving on to the next step.

CHANNEL 1 MODEL -VIEW	
MANUF:	ABC
MODEL:	123A
S/N:	12345

From the MODEL VIEW screen, use



to return to the

test.

## INFUSION ANALYZER-OCCLUSION

### RUNNING A DISTAL OCCLUSION TEST

#### STEP 1 ➤

##### Begin Test

Press  to begin the DISTAL OCCLUSION test.

<b>CHANNEL 1</b>	<b>DIST OCCL</b>
<b>OCCL PRESS</b>	<b>0.0PSI</b>
<b>MAX PRESS</b>	<b>0.0PSI</b>
<b>ELAPSED TIME</b>	<b>00:00:00</b>

#### STEP 2 ➤

##### Test Active


Throughout the duration of the test, data will update and display.

<b>CHANNEL 1</b>	<b>DIST OCCL</b>
<b>OCCL PRESS</b>	<b>0.0PSI</b>
<b>MAX PRESS</b>	<b>0.0PSI</b>
<b>ELAPSED TIME</b>	<b>00:00:00</b>

## INFUSION ANALYZER-OCCLUSION

### STEP 3 ➤

#### Stop the Test

Press  when the test is completed.

#### **NOTE:**

•Three readings are taken after a NURSE CALL message. This is done to confirm that the DUT shut down after the call.

The test is also terminated by a NURSE CALL.

### STEP 4 ➤

#### View Datalog


When the test is completed, the screen will automatically change to display the Datalog for that test.

#### **NOTES:**

(See **DATALOG--OCCLUSION TEST** for details.)

•A NURSE CALL reading is time stamped and recorded in the Datalog.  
•Datalogs are stored and can be printed out at any time.  
•If Autoprint is selected, the printout will automatically print when the test is completed.  
(See **USER SETUP** for details.)

<b>CHANNEL 1</b>	<b>DIST OCCL</b>
<b>OCCL PRESS</b>	<b>0.0PSI</b>
<b>MAX PRESS</b>	<b>0.0PSI</b>
<b>ELAPSED TIME</b>	<b>00:00:00</b>

If a printer is connected, use  to get the printout of the current test's Datalog.

# INFUSION ANALYZER--OCCLUSION

## DATALOG SAMPLE FOR A DISTAL OCCLUSION TEST

### NOTES:

- This sample shows both summary and data information.
- There are three options for the form of the report: Summary, Data Points or Summary and Data.
- This option can be selected from the Datalog screen.
- (See **DATALOG--OCCLUSION TEST** for details.)

PAGE 01

BC GROUP  
IPA-2000S INFUSION PUMP ANALYZER

#### PUMP INFORMATION:

MANUFACTURER: ABC MODEL: 123  
SERIAL NUMBER: 1001  
DEPARTMENT: SURGERY LOCATION: LOCATION 1

TEST STARTED AT: 17:07:00 ON 7/16/02

#### CHANNEL 1 OCCLUSION PRESSURE TEST

ELAPSED PRESSURE

TIME PSI

00:00 5.7  
00:01 5.7  
00:02 5.7  
00:03 5.7  
00:04 5.8  
00:05 6.6  
00:06 6.8  
00:07 6.8  
00:08 6.8  
00:09 6.8  
00:10 6.8  
00:11 6.6  
00:12 6.6  
00:13 6.7  
00:14 7.1  
00:15 7.1  
00:16 7.1

NURSE CALL INPUT

00:17 7.1  
00:18 6.8  
00:19 6.6  
00:14 7.2

END OF DATA

#### CHANNEL 1 OCCLUSION TEST SUMMARY

MAXIMUM OCCLUSION PRESSURE 7.2PSI  
OCCURRED AT TEST TIME 0:00:14  
NURSE CALL INPUT AT TIME 0:00:16

### NOTES:

- The pressure is recorded once per second, however, it is monitored every 1/100 of a second. Thus, the peak pressure may occur between the stored Data Points.
- The last Data Point shows the maximum pressure detected and the time closest to that reading.

## **INFUSION ANALYZER--OCCLUSION**

### **PROXIMAL OCCLUSION TEST OVERVIEW**

This section covers how to run a Proximal Occlusion test. This test offers a convenient timer to use while performing a Proximal test manually.

The following is an outline of the steps that are involved in performing an Infusion Analyzer Proximal Occlusion test.

#### **GETTING READY FOR A PROXIMAL OCCLUSION TEST**

- Choose Channel Screen
- Choose Test

#### **RUNNING A PROXIMAL OCCLUSION TEST**


- Begin Timer
- Stop Timer

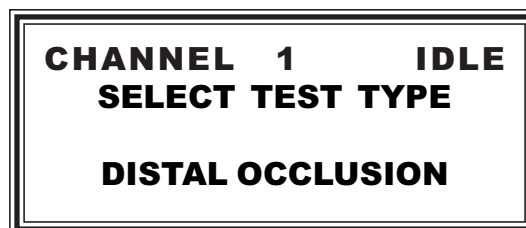
## INFUSION ANALYZER-OCCLUSION

### GETTING READY FOR A PROXIMAL OCCLUSION TEST

#### STEP 1 ➤

##### Choose Channel Screen

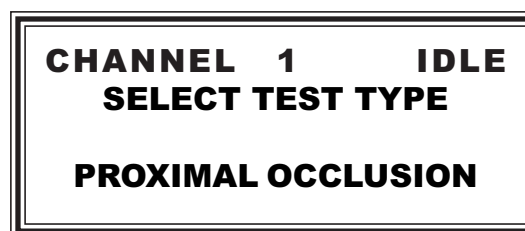
To run a test, toggle to the appropriate Channel screen using  .



#### STEP 2 ➤

##### Choose Test

Scroll to PROXIMAL OCCLUSION test using






## INFUSION ANALYZER–OCCLUSION

### RUNNING A PROXIMAL OCCLUSION TEST

#### STEP 1 ➤

##### Begin Test


Occlude the upstream fluid path.

Press  to begin the timer.

**CHANNEL 1 PROX OCCL  
ELAPSED TIME 00:00:00**

#### STEP 2 ➤

##### Stop Test

Press  to stop the timer. This should be done when the pump alarm sounds. Insure the pump stops and/or performs such action as called out by the pump manufacturer.

**CHANNEL 1 PROX OCCL  
ELAPSED TIME XX:XX:XX**

### **OCCLUSION TEST DATALOG OVERVIEW**

This section covers how to access and choose specific Infusion Analyzer Occlusion Datalogs. It begins with an overview and then progresses through step-by-step instructions for manipulating and using the Datalogs.

The Distal Occlusion tests record the data in the Datalogger for review and/or generation of a printed report.

The Datalog and report also contain the maximum pressure point and, if used, the time of the Nurse Call is noted and three additional pressure readings are taken to insure the pump was turned off.

No data is recorded for Proximal Occlusion tests.

The following is an outline of the steps that are involved in working with the Datalogger.

#### **WORKING WITH THE DATALOGGER**

- Enter the Datalogger
- View Occlusion Test Datalog
- View a Specific Record
- Go into Datalog Edit Mode
- Scroll to Desired Record Number
- Enter Choice for Record Number
- View or Print Occlusion Test Datalog

## DATALOG–OCCLUSION TEST

### OCCLUSION TEST DATALOG

#### STEP 1 ➤

#### Enter the Datalogger

There are three ways to enter the Datalogger:

**NOTE:**

•See *STEPS 1a through 1c* for details.

- 1.) Manually from the Main Screen
- 2.) Manually from Channel 1, Channel 2 or Safety Analyzer Idle screens
- 3.) Automatically from the final screen of a Channel 1, Channel 2

## DATALOG-OCCLUSION TEST


### STEP 1a ➤

#### NOTE:


•All saved data is accessible from the Main Screen, even if the channel is not active.

Enter the Datalogger From the Main Screen

<b>IPA-2000S</b>
<b>Month Day, Year</b>
<b>00:00:00</b>

Use  to enter the Datalogger.

<b>CHAN1</b>	<b>DATALOG- VIEW</b>
<b>RECORD TYPE</b>	<b>FLOW</b>
<b>PRINT</b>	<b>SUMMARY &amp; DATA</b>
<b>RECORD NUMBER</b>	<b>01</b>

Use  to toggle through the Datalogs for each channel.

<b>CHAN2</b>	<b>DATALOG- VIEW</b>
<b>RECORD TYPE</b>	<b>FLOW</b>
<b>PRINT</b>	<b>SUMMARY &amp; DATA</b>
<b>RECORD NUMBER</b>	<b>01</b>

<b>SAFETY DATALOG- VIEW</b>	
<b>RECORD NUMBER</b>	<b>01</b>
<b>START TIME</b>	<b>00:00:00</b>
<b>START DATE</b>	<b>01/01/02</b>

## DATALOG--OCCLUSION TEST

### STEP 1b ➤

#### NOTES:

•Only data for the channels which are connected is accessible.

•These instructions will utilize Channel 1 for examples; Channel 2 functions identically.

•Datalogs for these channels can be toggled to using



### Enter the Datalogger From a Test Idle Screen

Use  to toggle to the Channel 1 Idle screen.

<b>CHANNEL 1</b>	<b>IDLE</b>
<b>SELECT TEST TYPE</b>	
<b>OCCLUSION TEST</b>	

Use  to enter the Datalogger.

<b>CHAN1 DATALOG- VIEW</b>
<b>RECORD TYPE OCCL</b>
<b>PRINT SUMMARY &amp; DATA</b>
<b>RECORD NUMBER 01</b>

### STEP 1c ➤

#### NOTES:

•Only data for the channels which are connected is accessible.

•These instructions will utilize Channel 1 for examples; Channel 2 functions identically.

•Datalogs for these channels can be toggled to using



### Enter the Datalogger After a Test is Complete

After an Occlusion test is completed, the unit will automatically go to the Datalog for that test.

<b>CHANNEL 1</b>	<b>OCCL</b>
<b>AVG FLOW</b>	<b>0.0mL/hr</b>
<b>TOTAL VOL</b>	<b>.00mL</b>
<b>ELAPSED TIME</b>	<b>00:00:00</b>

<b>CHAN1 DATALOG-</b>		
<b>TIME 00:01</b>	<b>PRES</b>	<b>0.0</b>
<b>TIME 00:02</b>	<b>PRES</b>	<b>0.0</b>
<b>TIME 00:03</b>	<b>PRES</b>	<b>0.0</b>

## DATALOG–OCCLUSION TEST

### STEP 2 ➤

#### Go To Occlusion Test Datalog

If the Record Type is already OCCL, continue to Step 3.



If not, select OCCL for the Record Type (See Steps 2a through 2d).

### STEP 2a ➤

#### NOTE:

•The selected information is indicated by the flashing cursor.

#### Scroll to Record Type Information Line

Use   to scroll to the Record Type information.

CHAN1	DATALOG-	VIEW
RECORD TYPE		FLOW
PRINT	SUMMARY & DATA	
RECORD NUMBER		01

### STEP 2b ➤


#### NOTE:

•In the Edit mode, the flashing line cursor will change to a box.

#### Go into Datalog Edit Mode

When the cursor is under the Record Type,



use  to enter the Edit mode.

CHAN1	DATALOG-	EDIT
RECORD TYPE		FLO 
PRINT	SUMMARY & DATA	
RECORD NUMBER		01

## DATALOG-OCCLUSION TEST

### STEP 2c ➤


#### Scroll to Record Type Occlusion

Use   to choose OCCL for the desired Record Type.

CHAN1	DATALOG-	EDIT
RECORD TYPE		OCC
PRINT	SUMMARY & DATA	
RECORD NUMBER		01

### STEP 2d ➤

#### Enter Choice and Return to View Mode

Use  to enter the new Record Type and return to the View mode.

CHAN1	DATALOG-	VIEW
RECORD TYPE		OCCL
PRINT	SUMMARY & DATA	
RECORD NUMBER		01

## DATALOG-OCCLUSION TEST

### STEP 3

#### NOTES:

•The screen displays any three consecutive information lines of the record.

#### View Occlusion Test Datalog

Use



to scroll the available information.

#### OCCLUSION DATALOG RECORD

**RECORD TYPE**  
**PRINT**  
**RECORD NUMBER**  
**START TIME**  
**START DATE**  
**MANUF:**  
**MODEL:**  
**S/N:**  
**DEPT:**  
**LOC:**

(FOR EACH DATA POINT)

**TIME**      **PRES**

**MAX PRESS**  
**AT TIME**  
**NURSE CALL** (IF USED)



**CHAN1 DATALOG- VIEW**  
**RECORD TYPE      OCCL**  
**PRINT      SUMMARY & DATA**  
**RECORD NUMBER      01**

•The cursor and VIEW are only displayed when there is information which can be changed to access other records.

•NO DATA AVAILABLE is displayed if there are no records.





## DATALOG-OCCLUSION TEST

### STEP 4 ➤

#### NOTES:

- The selected information is indicated by the flashing cursor.
- The Print information can be selected by following Step 4 through Step 6 and substituting "Print" for "Record Number."
- The available options for Print are Summary, Data Points or Summary & Data.

### View a Different Record

If it is necessary to find another record, use   to scroll to the Record Number information.


<b>CHAN1 DATALOG- VIEW</b>
<b>RECORD TYPE OCCL</b>
<b>PRINT SUMMARY &amp; DATA</b>
<b>RECORD NUMBER 01</b>

### STEP 5 ➤

#### NOTE:

- In the Edit mode, the flashing line cursor will change to a box.

### Go into Datalog Edit Mode



When the cursor is under the Record Number, use  to enter the Edit mode.

<b>CHAN1 DATALOG- EDIT</b>
<b>RECORD TYPE OCCL</b>
<b>PRINT SUMMARY &amp; DATA</b>
<b>RECORD NUMBER 0</b>

## DATALOG-OCCLUSION TEST

### STEP 6 ➤

#### Scroll to Desired Record Number

Use   to choose the desired record number for a saved Occlusion test.

CHAN1	DATALOG-	EDIT
RECORD TYPE		OCCL
PRINT	SUMMARY & DATA	
RECORD NUMBER		0

### STEP 7 ➤



#### Enter Choice for Record Number

Use  to enter the new Record Number and return to the View mode.


CHAN1	DATALOG-	VIEW
RECORD TYPE		OCCL
PRINT	SUMMARY & DATA	
RECORD NUMBER		02

### STEP 8 ➤

#### View or Print Safety Analyzer Datalog

Use   to scroll the available information.

or

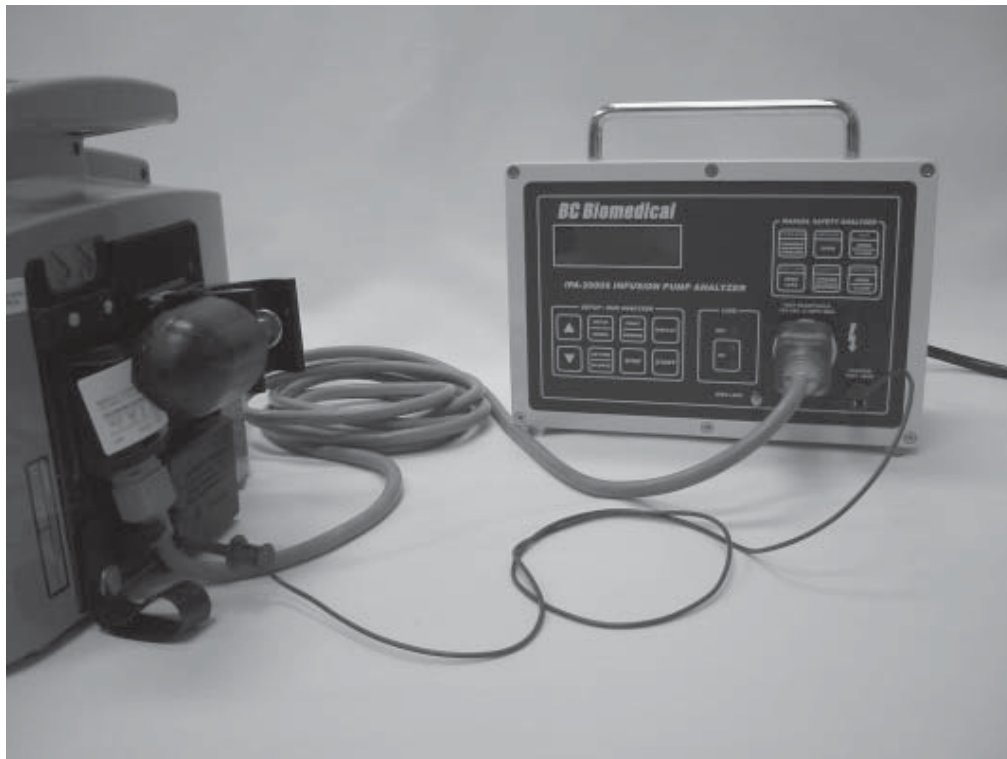
Use  to print the current Datalog.

(See **PRINTING REPORTS** for details.)

## **SAFETY ANALYZER--MANUAL MODE**

### **PART 5 : SAFETY ANALYZER--MANUAL MODE**

This section covers how to manually perform a Safety Analyzer test. It begins with an overview and then progresses through step-by-step instructions for running the test, including a table showing the combinations which should be performed. Unlike the automatic mode, no data is saved in the Datalog from these tests.



## **SAFETY ANALYZER—MANUAL MODE**

### **MANUAL TEST OVERVIEW**

The following is an outline of the steps that are involved in performing a Manual Safety Analyzer test.

#### **GETTING READY FOR A MANUAL TEST**

- Choose Safety Analyzer Screen
- Connect Device

#### **RUNNING A MANUAL TEST**

- Begin Manual Test
- Line Status
- Ground Chassis Lead
- Manually Set Combinations

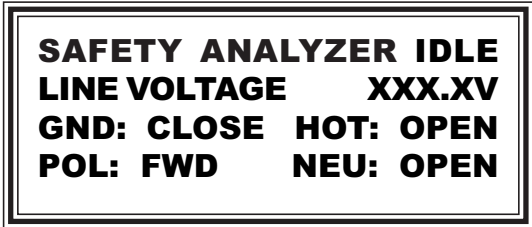
## SAFETY ANALYZER—MANUAL MODE

### GETTING READY FOR A MANUAL TEST

#### STEP 1 ➤

##### Choose Safety Analyzer Screen

To run a manual safety analyzer test, toggle to the Safety Analyzer Idle screen using .



**SAFETY ANALYZER IDLE**  
**LINE VOLTAGE     XXX.XV**  
**GND: CLOSE    HOT: OPEN**  
**POL: FWD       NEU: OPEN**

#### STEP 2 ➤

##### Connect Device

Plug device under test (DUT) power cord into the test receptacle.

# SAFETY ANALYZER—MANUAL MODE

## RUNNING A MANUAL TEST

### STEP 1 ➤

#### Begin Manual Test


Press any button on the manual test keypad to turn on the power to the receptacle and to go into the Safety Analyzer Manual mode.

In the manual test mode, the display will show the latest measurements from the Safety Analyzer, as well as the status of the Test Receptacle.

**NOTE:**

•Use   to scroll the information in the data line.

**DATA LINE SCROLL OPTIONS**



<b>LINE</b>	<b>VOLTAGE</b>	<b>XXX.XV</b>
<b>GND</b>	<b>RESIST</b>	<b>XX.XXΩ</b>
<b>LOAD</b>	<b>CURRENT</b>	<b>XX.XXA</b>
<b>GND</b>	<b>LEAKAGE</b>	<b>**** μA</b>
<b>CHS</b>	<b>LEAKAGE</b>	<b>**** μA</b>

<b>SAFETY ANALYZER MAN</b>	
<b>DATA LINE</b>	
<b>GND: CLOSE</b>	<b>HOT: OPEN</b>
<b>POL: FWD</b>	<b>NEU: OPEN</b>

**NOTES:**

- Lead must be zeroed to have valid ground resistance value.
- Ground Leakage Current only reads if ground is open.
- Chassis Leakage Current will only read with use of zeroed lead.
- Leakage Current will alternate between GND and CHS depending on setting.
- Any of these readings will show — if the value is beyond the range of the scale.

## SAFETY ANALYZER—MANUAL MODE

### STEP 2 ➤

#### NOTES:





•**CAUTION:** If a printer is connected to the unit and the two are plugged into separate outlets, the system cannot detect an invalid ground on the outlet the unit is plugged into if the printer is plugged into a valid outlet.

#### •Table Key:

- = Green LED
- ◐ = LED Off
- = Red LED

### Line Status

The first step in the test process is to analyze the line status. This is done automatically, from the moment the analyzer is plugged in and the line LEDs give a continuous indication of the line status. Two green LEDs are necessary for testing; if not, the user will see an alarm (See **ALARMS** for details) on an attempt to run a test.

			
<b>Wiring Correct</b>	<b>Polarity Reversed</b>	<b>Ground Opened</b>	<b>Hot Opened</b>

## SAFETY ANALYZER—MANUAL MODE

### STEP 3 ➤

#### Ground Chassis Lead

In order to make an accurate chassis ground resistance measurement, the test lead must be calibrated. The user must plug a test lead into the “chassis ground” banana jack on the analyzer. The lead must then be touched and held to the “zero lead” stud until the lowest resistance is displayed.

#### **NOTE:**


•Ground Resistance Data Line will flash



until the lead is zeroed.

**SAFETY ANALYZER MAN**  
**GROUND RESIS** -- --,-- --Ω  
**GND: CLOSE HOT: OPEN**  
**POL: FWD NEU: OPEN**



Press  to save this lead resistance value. It will be used to compensate for the test lead resistance.

#### **NOTES:**

- The lead will only need to be zeroed the first time a Safety Analyzer test is run after the analyzer is turned on.
- If a different lead is used, the analyzer should be re-calibrated for that test lead.
- The test will not continue if the lead resistance is too high.
- DUT manufacturer's documentation may have a specific location on DUT for lead to test chassis leakage.

When zeroing is completed, the Lead Resistance value in the display should be 00.00Ω. The lead should then be disconnected from the stud and connected to the DUT casing. Ground Resistance readings will only be valid if this is done.



## SAFETY ANALYZER—MANUAL MODE

### STEP 4 ➤

#### NOTE:

- Open Ground is momentary when is pressed.



### Manually Set Combinations

Using the keypad, go through the combinations for a manual test. No Datalog is kept for a manual test, so any data needed should be manually recorded from the available scrolled information.

The following is a table showing the possible combinations that should be tested:  
(Consult Equipment Manufacturer Manual for recommended testing.)

POWER	LEAKAGE	GROUND	POLARITY	HOT	NEUTRAL
On	Ground	Open	Forward	Closed	Closed
On	Ground	Open	Forward	Closed	Open
On	Ground	Open	Forward	Open	Closed
On	Ground	Open	Reverse	Closed	Closed
On	Ground	Open	Reverse	Closed	Open
On	Ground	Open	Reverse	Open	Closed
On	Chassis	Open	Forward	Closed	Closed
On	Chassis	Open	Reverse	Closed	Closed
On	Chassis	Closed	Forward	Closed	Closed
On	Chassis	Closed	Reverse	Closed	Closed
Off	Ground	Open	Forward	Closed	Closed
Off	Ground	Open	Forward	Closed	Open
Off	Ground	Open	Forward	Open	Closed
Off	Ground	Open	Reverse	Closed	Closed
Off	Ground	Open	Reverse	Closed	Open
Off	Ground	Open	Reverse	Open	Closed
Off	Chassis	Open	Forward	Closed	Closed
Off	Chassis	Open	Reverse	Closed	Closed
Off	Chassis	Closed	Forward	Closed	Closed
Off	Chassis	Closed	Reverse	Closed	Closed

Press



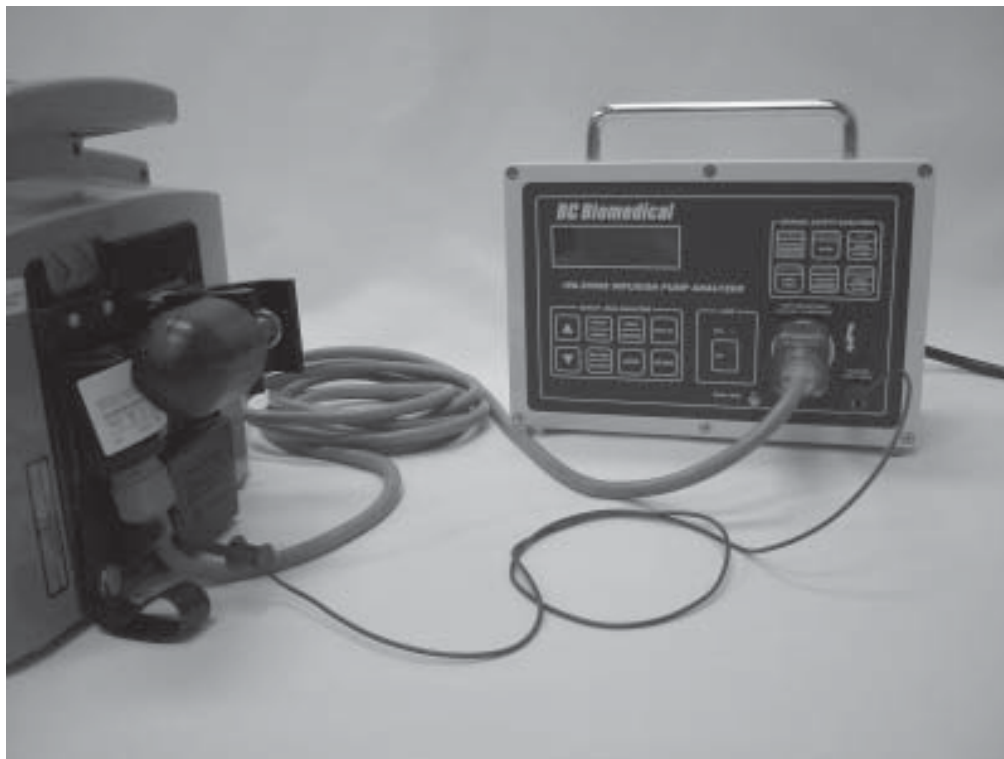
to return to IDLE mode.

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## **SAFETY ANALYZER--AUTOMATIC MODE**

### **PART 6 : SAFETY ANALYZER--AUTOMATIC MODE**

This section covers how to run an automatic Safety Analyzer test and view the results. It begins with an overview and then progresses through step-by-step instructions for running the test. The Automatic test records data and reports conditions for maximum ground and chassis leakage.



## **SAFETY ANALYZER–AUTOMATIC MODE**

### **AUTOMATIC TEST OVERVIEW**

The following is an outline of the steps that are involved in performing an Automatic Safety Analyzer test.

#### **GETTING READY FOR AN AUTOMATIC TEST**

- Choose Safety Analyzer Screen
- Choose Model of Unit Being Tested
- Connect Device

#### **RUNNING AN AUTOMATIC TEST**

- Begin Automated Test
- Line Status
- Ground Chassis Lead
- Line Voltage
- Ground Lead Verification
- Leakage Currents With DUT Power Off
- Leakage Currents With DUT Power On
- Datalog

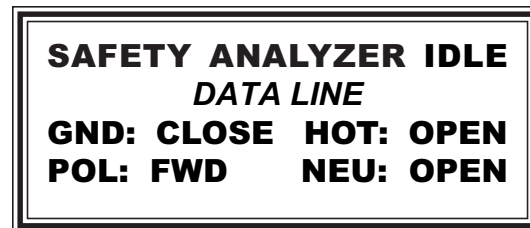
## SAFETY ANALYZER-AUTOMATIC MODE

### GETTING READY FOR AN AUTOMATIC TEST

#### STEP 1 ➤

##### Choose Safety Analyzer Screen

To run an automatic safety analyzer test, toggle to the Safety Analyzer Idle screen using



#### STEP 2 ➤

##### Choose Model of Unit Being Tested

Use



to go to MODEL VIEW screen to enter Manufacturer, Model, Serial Number, Department and Location. (See **MODEL SELECTION** for details.)

##### **NOTES:**

•Each test is identified by time, date and record number.

•A test's identification can be further enhanced by entering model and location information to be included in the Datalogger and printouts.

•This step is optional and can be bypassed by simply moving on to the next step.



From the MODEL VIEW screen, use



to return to the

test.

#### STEP 3 ➤

##### Connect Device

Plug device under test (DUT) power cord into the test receptacle.

## **SAFETY ANALYZER–AUTOMATIC MODE**

### **RUNNING AN AUTOMATIC TEST**


#### **STEP 1 ➤**

##### **Begin Automated Test**

The automated test is performed in steps. Some of the steps require user intervention. Measurements must be made with the device under test (DUT) power ON and OFF. The analyzer will indicate when user intervention is required.

Use  to go into the Safety Analyzer Auto mode.



Then press  again to initiate the test.

# SAFETY ANALYZER—AUTOMATIC MODE

## STEP 2 ➤

**NOTES:**

•**CAUTION:** If a printer is connected to the unit and the two are plugged into separate outlets, the system cannot detect an invalid ground on the outlet the unit is plugged into if the printer is plugged into a valid outlet.

•Table Key:

- = Green LED
- ◐ = LED Off
- = Red LED

### Line Status

The first step in the test process is to analyze the line status.

This is done automatically, from the moment the analyzer is plugged in and the line LEDs give a continuous indication of the line status. Two green LEDs are necessary for testing; if not, the user will see an alarm (See **ALARMS** for details) on an attempt to run a test.

<b>Wiring Correct</b>	<b>Polarity Reversed</b>	<b>Ground Opened</b>	<b>Hot Opened</b>


## SAFETY ANALYZER–AUTOMATIC MODE

### STEP 3 ➤

#### Ground Chassis Lead

In order to make an accurate chassis ground resistance measurement, the test lead must be calibrated. The user must plug a test lead into the “chassis ground” banana jack on the analyzer. The lead must then be touched and held to the “zero lead” stud until the lowest resistance is displayed.



Press  to save this lead resistance. It will be used to compensate for the test lead resistance.

#### **NOTES:**

- The lead will only need to be zeroed the first time a Safety Analyzer test is run after the analyzer is turned on.
- If a different lead is used, the analyzer should be re-calibrated for that test lead.
- The test will not continue if the lead resistance is too high.
- DUT manufacturer's documentation may have specific location on DUT for lead to test chassis leakage.

When zeroing is completed, the Lead Resistance value in the display should be 00.00Ω. The lead should then be disconnected from the stud and connected to the DUT casing. Ground Resistance readings will only be valid if this is done.



## SAFETY ANALYZER–AUTOMATIC MODE

### STEP 4 ➤

#### Line Voltage

To ensure normal operating conditions for the DUT, the Line Voltage is measured in this step. The display will indicate if Line Voltage Passed.

(See **ALARMS** for details if it does not pass).

#### **NOTE:**

•The Line Voltage must be within +20% to –10% of its rated value.

**SAFETY ANALYZER AUTO  
LINE VOLTAGE CHECK**

### STEP 5 ➤

#### Ground Lead Verification

To help confirm the ground lead is properly zeroed and connected, the ground resistance measurement is verified in this step. The display will indicate if Ground Resistance is invalid and will pause the test until the needed correction is made.

#### **NOTES:**

•Ground Resistance would be invalid if:

- the lead is not properly attached to the DUT
- the lead is still attached to stud
- the test lead is bad or broken

•If the lead is adjusted and the measurement becomes valid, the test will continue.

**SAFETY ANALYZER AUTO  
GND RESIST INVALID  
LIMIT 2.00Ω  
MEASUREMENT ---Ω**

## SAFETY ANALYZER-AUTOMATIC MODE

### STEP 6 ➤




#### NOTES:

- The Ground Leakage Test will measure the current with the Test Receptacle polarity forward and reversed (normal conditions) and the Ground connection closed (normal condition) and open (fault condition).
- The analyzer will monitor for the maximum leakage current in both normal and fault conditions.

### Leakage Currents With DUT Power Off

In this step, the Ground and Chassis Leakage Currents are measured with the DUT turned OFF. This step must be initialized by the user to ensure that the DUT is turned OFF.

**SAFETY ANALYZER AUTO  
TURN TEST UNIT OFF  
THEN PRESS START**

The unit will automatically sequence through the following screens, after  is pressed.

## **SAFETY ANALYZER-AUTOMATIC MODE**

### Ground Leakage Test--Unit Off

**SAFETY ANALYZER AUTO  
GROUND LEAKAGE TEST  
DUT: OFF      POL: FWD  
NEU: CLOSE   HOT: CLOSE**

**SAFETY ANALYZER AUTO  
GROUND LEAKAGE TEST  
DUT: OFF      POL: FWD  
NEU: OPEN     HOT: CLOSE**

**SAFETY ANALYZER AUTO  
GROUND LEAKAGE TEST  
DUT: OFF      POL: FWD  
NEU: CLOSE    HOT: OPEN**

**SAFETY ANALYZER AUTO  
GROUND LEAKAGE TEST  
DUT: OFF      POL: REV  
NEU: CLOSE    HOT: OPEN**

**SAFETY ANALYZER AUTO  
GROUND LEAKAGE TEST  
DUT: OFF      POL: REV  
NEU: OPEN     HOT: CLOSE**

**SAFETY ANALYZER AUTO  
GROUND LEAKAGE TEST  
DUT: OFF      POL: REV  
NEU: CLOSE    HOT: CLOSE**

## SAFETY ANALYZER-AUTOMATIC MODE

### NOTES:

- The unit will proceed to the Chassis Leakage Test and will automatically run.
- The current will be measured just as with the Ground Leakage Test.

### Chassis Leakage Test--Unit Off

**SAFETY ANALYZER AUTO  
CHASSIS LEAKAGE TEST  
DUT: OFF            POL: FWD  
GND: CLOSE**

**SAFETY ANALYZER AUTO  
CHASSIS LEAKAGE TEST  
DUT: OFF            POL: FWD  
GND: OPEN**

**SAFETY ANALYZER AUTO  
CHASSIS LEAKAGE TEST  
DUT: OFF            POL: REV  
GND: OPEN**

**SAFETY ANALYZER AUTO  
CHASSIS LEAKAGE TEST  
DUT: OFF            POL: REV  
GND: CLOSE**

## SAFETY ANALYZER–AUTOMATIC MODE

### STEP 6 ➤



#### NOTES:

•The Ground Leakage and Chassis Leakage Current Test will be run the same as above, only the DUT will be ON.

•There may be instances when the DUT power is on but the unit continues to request it be turned on. Since there is a certain amount of current running through the DUT even when the power is off, the unit determines whether the unit is on by looking at the differential between the on and off currents (Current On must be greater than 125% of Current Off for automatic sensing to work).

•If the differential is not enough, the user can tell unit the DUT is on by pressing



### Leakage Currents With DUT Power On

In this step, the Ground and Chassis Leakage Currents are measured with the DUT turned ON. This step must be initialized by the user to ensure that the DUT is turned ON.

**SAFETY ANALYZER AUTO  
TURN TEST UNIT ON**

The system will sense that the power has been turned on and continue the test, sequencing through the following screens.

## **SAFETY ANALYZER--AUTOMATIC MODE**

### Ground Leakage Test--Unit On

**SAFETY ANALYZER AUTO  
GROUND LEAKAGE TEST  
DUT: ON            POL: FWD  
NEU: CLOSE    HOT: CLOSE**

**SAFETY ANALYZER AUTO  
GROUND LEAKAGE TEST  
DUT: ON            POL: FWD  
NEU: OPEN     HOT: CLOSE**

**SAFETY ANALYZER AUTO  
GROUND LEAKAGE TEST  
DUT: ON            POL: FWD  
NEU: CLOSE    HOT: OPEN**

**SAFETY ANALYZER AUTO  
GROUND LEAKAGE TEST  
DUT: ON            POL: REV  
NEU: CLOSE    HOT: OPEN**

**SAFETY ANALYZER AUTO  
GROUND LEAKAGE TEST  
DUT: ON            POL: REV  
NEU: OPEN     HOT: CLOSE**

**SAFETY ANALYZER AUTO  
GROUND LEAKAGE TEST  
DUT: ON            POL: REV  
NEU: CLOSE    HOT: CLOSE**

## SAFETY ANALYZER--AUTOMATIC MODE

### NOTES:

- The unit will proceed to the Chassis Leakage Test and will automatically run.
- The current will be measured just as with the Ground Leakage Test.

### Chassis Leakage Test--Unit On

**SAFETY ANALYZER AUTO  
CHASSIS LEAKAGE TEST  
DUT: ON            POL: FWD  
GND: CLOSE**

**SAFETY ANALYZER AUTO  
CHASSIS LEAKAGE TEST  
DUT: ON            POL: FWD  
GND: OPEN**

**SAFETY ANALYZER AUTO  
CHASSIS LEAKAGE TEST  
DUT: ON            POL: REV  
GND: OPEN**

**SAFETY ANALYZER AUTO  
CHASSIS LEAKAGE TEST  
DUT: ON            POL: REV  
GND: CLOSE**

## SAFETY ANALYZER-AUTOMATIC MODE

### STEP 7 ➤

#### NOTES:

•Datalogs are stored and can be printed out at any time.

•If Autoprint is selected, the printout will automatically print when the test is completed.

(See **USER SETUP** for details.)

### Datalog

When the test is completed, the screen will automatically change to display the Datalog for that test.

(See **DATALOG--SAFETY ANALYZER** for details.)

<b>SAFETY DATALOG-</b>	
<b>PASS - WITHIN LIMITS</b>	
<b>LINE VOLTAGE</b>	<b>000.0V</b>
<b>GROUND RESIST</b>	<b>0.00Ω</b>

If a printer is connected, use



to get the printout of

the current test's Datalog.



# SAFETY ANALYZER-AUTOMATIC MODE

## DATALOG SAMPLE FOR AN AUTOMATIC TEST

### NOTES:

•This sample shows both summary and data information.

•There are three options for the form of the report: Summary, Data Points or Summary and Data.

•This option can be selected from the Datalog screen.

•(See **DATALOG--SAFETY ANALYZER** for details.)

### NOTE:

•The Summary reports a Pass or Fail message, telling which state caused the failure.

#### PASS / FAIL REPORT MESSAGES

PASS - WITHIN LIMITS  
FAIL - PLUG POLARITY  
FAIL - LINE VOLTAGE  
FAIL - LOAD CURRENT  
FAIL - OPEN FUSE  
FAIL - NORM GND CUR  
FAIL - FAULT GND CUR  
FAIL - NORM CHS CUR  
FAIL - FAULT CHS CUR

PAGE 01

BC GROUP  
IPA-2000 INFUSION PUMP ANALYZER

#### PUMP INFORMATION:

MANUFACTURER: PUMP MAKER MODEL: 123  
SERIAL NUMBER: 456789  
DEPARTMENT: ER LOCATION: HOSPITAL

TEST STARTED AT: 14:59:01 ON 6/27/02

#### SAFETY ANALYZER DATA

LINE VOLTAGE 125.3V  
GROUND RESISTANCE .08ohm  
LOAD CURRENT .06A

NORMAL GROUND CURRENT 15uA  
MEASUREMENT METHOD  
DUT: ON POL: FWD  
NEU: CLOSE HOT: CLOSE

FAULT GROUND CURRENT 25uA  
MEASUREMENT METHOD  
DUT: ON POL: REV  
NEU: OPEN HOT: CLOSE

NORMAL CHASSIS CURRENT 02uA  
MEASUREMENT METHOD  
DUT: OFF POL: REV  
GND: CLOSE

FAULT CHASSIS CURRENT 15uA  
MEASUREMENT METHOD  
DUT: OFF POL: FWD  
GND: OPEN

#### SAFETY ANALYZER SUMMARY

PASS - WITHIN LIMITS  
SAFETY SPECS AAMI  
MAX GROUND RESISTANCE .15ohm  
MAX NORMAL GROUND CURRENT 500uA  
MAX FAULT GROUND CURRENT 1000uA  
MAX NORMAL CHASSIS CURRENT 100uA  
MAX FAULT CHASSIS CURRENT 300uA

### **SAFETY ANALYZER DATALOG OVERVIEW**

This section covers how to access and choose specific Safety Analyzer Datalogs. It begins with an overview and then progresses through step-by-step instructions for manipulating and using the Datalogs.

The Automatic test records the data in the Datalogger for review and/or generation of a printed report.

The Datalog and report also contain analytical information about the test, including maximum ground and leakage currents and in which segment of the test they occurred.

The following is an outline of the steps that are involved in working with the Datalogger.

#### **WORKING WITH THE DATALOGGER**

- Enter the Datalogger
- View Safety Analyzer Datalog
- View a Specific Record
- Go into Datalog Edit Mode
- Scroll to Desired Record Number
- Enter Choice for Record Number
- View or Print Safety Analyzer Datalog

## DATALOG--SAFETY ANALYZER

### SAFETY ANALYZER DATALOG

#### STEP 1 ➤

#### Enter the Datalogger

There are three ways to enter the Datalogger:

**NOTE:**

•See STEPS 1a through 1c for details.

- 1.) Manually from the Main Screen
- 2.) Manually from Channel 1, Channel 2 or Safety Analyzer Idle screens
- 3.) Automatically from the final screen of a Safety Analyzer test

## DATALOG–SAFETY ANALYZER


### STEP 1a ➤

#### NOTE:


•All saved data is accessible from the Main Screen.

Enter the Datalogger From the Main Screen

<b>IPA-2000S</b>
<b>Month Day, Year</b>
<b>00:00:00</b>

Use  to enter the Datalogger.

<b>CHAN1 DATALOG- VIEW</b>
<b>RECORD TYPE      FLOW</b>
<b>PRINT SUMMARY &amp; DATA</b>
<b>RECORD NUMBER      01</b>

Use  to toggle through the Datalogs for each channel.

<b>CHAN2 DATALOG- VIEW</b>
<b>RECORD TYPE      FLOW</b>
<b>PRINT SUMMARY &amp; DATA</b>
<b>RECORD NUMBER      01</b>

<b>SAFETY DATALOG- VIEW</b>
<b>RECORD NUMBER      01</b>
<b>START TIME      00:00:00</b>
<b>START DATE      01/01/02</b>


## DATALOG--SAFETY ANALYZER

### STEP 1b ➤

#### Enter the Datalogger From a Test Idle Screen

Use  to toggle to the Safety Analyzer Idle screen.

**SAFETY ANALYZER IDLE**  
**DATA LINE**  
**GND: CLOSE    HOT: OPEN**  
**POL: FWD      NEU: OPEN**

Use  to enter the Datalogger.

**SAFETY DATALOG- VIEW**  
**RECORD NUMBER      01**  
**START TIME            00:00:00**  
**START DATE            01/01/02**

### STEP 1c ➤

#### Enter the Datalogger After a Test is Complete

After an automatic Safety Analyzer test is completed, the unit will automatically go to the Datalog for that test.

**SAFETY ANALYZER AUTO**  
**CHASSIS LEAKAGE TEST**  
**DUT: ON              POL: REV**  
**GND: CLOSE**



**SAFETY DATALOG-**  
**PASS -            WITHIN LIMITS**  
**LINE VOLTAGE        00.0V**  
**GROUND RESIST      00.00Ω**

## DATALOG--SAFETY ANALYZER

### STEP 2

### View Safety Analyzer Datalog

#### NOTES:

Use   to scroll the available information.

•The screen displays any three consecutive information lines of the record.

#### SAFETY ANALYZER DATALOG RECORD

<b>RECORD NUMBER</b>	
<b>START TIME</b>	
<b>START DATE</b>	
<b>MANUF:</b>	
<b>MODEL:</b>	
<b>S/N:</b>	
<b>DEPT:</b>	
<b>LOC:</b>	
<b>PASS-</b>	
<b>LINE VOLTAGE</b>	
<b>GROUND RESIST</b>	
<b>LOAD CURRENT</b>	
<hr/>	
<b>NORM GND CUR</b>	
<b>DUT:</b>	<b>POL:</b>
<b>NEU:</b>	<b>HOT:</b>
<hr/>	
<b>FAULT GND CUR</b>	
<b>DUT:</b>	<b>POL:</b>
<b>NEU:</b>	<b>HOT:</b>
<hr/>	
<b>NORM CHS CUR</b>	
<b>DUT:</b>	<b>POL:</b>
<b>GND:</b>	
<hr/>	
<b>FAULT CHS CUR</b>	
<b>DUT:</b>	<b>POL:</b>
<b>GND:</b>	

<b>SAFETY DATALOG- VIEW</b>
<b>RECORD NUMBER      01</b>
<b>START TIME          00:00:00</b>
<b>START DATE          01/01/02</b>

•The normal and fault information scroll in data sets.

•The cursor and VIEW are only displayed when there is information which can be changed to access other records.

•NO DATA AVAILABLE is displayed if there are no records.



## DATALOG–SAFETY ANALYZER

### STEP 3 ➤

#### NOTE:

•The selected information is indicated by the flashing cursor.

### View a Specific Record

If it is necessary to find another record, use   to scroll to the Record Number information line.


<b>SAFETY DATALOG- VIEW</b>	
<b>RECORD NUMBER</b>	<b>01</b>
<b>START TIME</b>	<b>00:00:00</b>
<b>START DATE</b>	<b>01/01/02</b>

### STEP 4 ➤

#### NOTE:

•In the Edit mode, the flashing line cursor will change to a box.

### Go into Datalog Edit Mode



When the cursor is under the Record Number, use  to enter the Edit mode.

<b>SAFETY DATALOG- EDIT</b>	
<b>RECORD NUMBER</b>	<b>01</b>
<b>START TIME</b>	<b>00:00:00</b>
<b>START DATE</b>	<b>01/01/02</b>

## DATALOG–SAFETY ANALYZER

### STEP 5 ➤


#### Scroll to Desired Record Number

Use   to choose the desired record number for a saved Safety Analyzer test.

<b>SAFETY DATALOG- EDIT</b>	
<b>RECORD NUMBER</b>	<b>0</b>
<b>START TIME</b>	<b>00:00:00</b>
<b>START DATE</b>	<b>01/01/02</b>

### STEP 6 ➤



#### Enter Choice for Record Number

Use  to enter the new Record Number and return to the View mode.


<b>SAFETY DATALOG- VIEW</b>	
<b>RECORD NUMBER</b>	<b>02</b>
<b>START TIME</b>	<b>00:00:00</b>
<b>START DATE</b>	<b>01/01/02</b>

### STEP 7 ➤

#### View or Print Safety Analyzer Datalog

Use   to scroll the available information.

or

Use  to print the current Datalog.

(See **PRINTING REPORTS** for details.)




## DATALOG–SAFETY ANALYZER

### STEP 8 ➤

#### NOTE:

•The unit saves the location in the Datalogger and will return to the same record if accessed through the test screens.

### Save and Return to Test Idle or Main Screen

When finished viewing desired Datalogs, use  to save position in the Datalogger and return to the Safety Analyzer Idle screen or to the Main Screen. The display will return to the screen through which the Datalogger was accessed.

**\*\*SAVE MODE\*\***

**SAFETY DATALOG- VIEW**  
**RECORD NUMBER      01**  
**START TIME          00:00:00**  
**START DATE          01/01/02**

or

**IPA-2000S**  
**Month Day, Year**  
**00:00:00**

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